



NEWS IN BRIEF

French plans bogged down

WHILE British plans to support its microelectronics industry are rapidly coming to fruition, French government plans have become bogged down. Only one part, known as SECIMOS, is to go ahead at the moment, according to French Industry Minister M. Giroud. This calls for the encouragement of US companies to ally themselves with French operations.

Though AMI, Harris, Mostek, National Semiconductor and Intel have been approached, no French company has yet shown any great interest.

Fruitless

WHILE Control Data is actively collaborating with the Yugoslav electronics enterprise Iskra on small computers, a similar agreement signed with Philips last year has borne no fruit. "The agreement has not been broken off by either side," a Philips spokesman told Computer Weekly, "but so far nothing has been done."

Colourful order

ACCURATE pigment matching is achieved by many industries with the specialised systems produced by Instrumental Colour Systems of Newbury, Berkshire. The company has placed an initial £300,000 order for microprocessor-based Digital Equipment PDP-11/03s around which the matching equipment is built. About 35 units are expected to be sold this year representing well over £500,000 business for DEC.

Sweet Systime

STOCKPORT confectioneer Squirrel Horn has replaced its VRC with a 64K byte Systime 3000 minicomputer based on a Digital Equipment PDP 11/04.

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Your chance to command the Greek gods

WOULD you like to command the Greek gods? Then enter the Othello contest being organised by systems consultants Zeus-Hermes in conjunction with Computer Weekly.

It is to be played out in London on July 7 and the first prize will be a hand-cut stone chess set depicting various Greek deities with Zeus-Hermes as King and Aphrodite as Queen. Lesser immortals are represented by other pieces and even if you are not a chess player it's a prize worth having.

Second prize will be a programmable calculator and the player in third place will receive a bottle of champagne. All contestants who get through the first round will be presented with the Othello board on which they win their round.

There already are about 40 entries and other intending competitors should apply for entry forms without delay to Laurence Chapman at Zeus-Hermes, Shropshire House, 2/10 Copper Street, London, WC1; Tel 01-323 0837. Only entries on the official form will be considered and priority will be given to players who represent their DP units.

To while away the time between Othello games there will be plenty of other attractions including two terminals linked to CDC's Call 380 time sharing service on which a whole series of games, such as Moonlanding and various chess problems, can be played. There will also be more traditional tests of skill such as table tennis and darts.

It will be an absorbing evening as if you want to prove your prowess at Othello, apply for an entry form now.

First UK Multics goes to Bath

THE first Honeywell Level 68/DPS Multics system sold outside the US is to be installed at Bristol and Bath Universities.

The £2 million mainframe will become the basis of a new Avon Universities Computer Centre, and will support 80 interactive terminals in Bath and 150 in Bristol.

As exclusively forecast (CW, November 24, 1977) Honeywell has simultaneously announced the Level 68/DPS Multics system for the UK market. Deliveries begin in the fourth quarter of this year. So far no more than two dozen Multics systems have been installed.

The Avon Universities Computer Centre will complement the existing South West Universities Regional Computer Centre at Bath, which is equipped with an ICL 2980.

Originally developed at the Massachusetts Institute of Technology, and taken up by GE, Multics passed to Honeywell with GE's other computer businesses in 1970. It is best known for the "rings of protection," implemented mainly in hardware which effectively isolate each user and application from all others. It is widely regarded as the most secure hardware and software system available.

However, the other major aim was to design a system to support large numbers of interactive users, and it was performance in transaction processing benchmarks which won the contract over the other finalists, CDC, IBM and DEC.

"Multics has an excellently consistent approach to interactive processing, and the way in which file stores and virtual memory management are integrated is very good," Dr Alex Nichol, director of the Bath University Computer Centre told Computer Weekly.

The South West Universities — Bath, Bristol, Cardiff and Exeter — at present have a network of linked ICL System 4s, and the plan is to overlay this with an X25 packet-switched network. A network interface processor to link the old with the new is being developed on a GEC 4070 mini, and an X25 interface is being developed on the 2980 at Bath.

Although some batch work will be run on Multics, the 2980 is designated as the batch machine.

The next university due for new hardware is Cardiff, and it is planned that whatever the Welsh university chooses will be attached to the X25 network.

"To start with, we will concentrate mainly on the traditional university languages, Fortran and Basic, but we have visited that University of Southwest Louisiana, which has developed Pascal on Multics and we plan to put that up fairly soon," said Dr Nichol.

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First user

A NEW purpose-built distribution and service centre opened by Honeywell in Braconett, Berkshire, has become the first user of the TFS 8/600 transaction processing system developed by sister company Honeywell Information Systems.

New US law would 'free' AT&T

LEGISLATION that would free AT&T from restrictions, which at present prevent it from offering computer services, has been proposed by two US Congressmen who are also members of the House of Representatives Communications Subcommittee. The Legislation would also require both AT&T and GTE to sell off their manufacturing interests.

The proposals are contained in a major draft Bill which would completely overhaul US federal communications law for the first time in its 44-year history, and replace the seven-man Federal Communications Commission with a five-man Communications Regulatory Commission with more limited powers.

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Scottish MPs want ICL base in Dundee

A SUGGESTION by two Dundee MPs that any further expansion by ICL should be located in Dundee has been acknowledged by the company, although it has added that there is "little prospect" of any manufacturing base being set up there in the near future.

The two MPs Peter Dolg (Labour) and Gordon Wilson (Scottish Nationalist) pointed out at a meeting with Scottish Minister of State, Gregor Mackenzie, that the Tayside Regional Council and five other Scottish local authorities had placed orders worth £6 million with ICL.

In reply, ICL has said that although it has no such manufacturing operations, talks did take place with the Scots on what could be done in the area at the time ICL was formed by the merger of ICI and English Electric. However, these talks only led to the formation of ICI's Scottish development centre at Dalkeith.

"The computer industry is not labour intensive in terms of manufacturing," said an ICL spokesman, "and there is little prospect of growth in our manufacturing employment levels."

The two MPs also suggested during their meeting with the Minister that he and his colleagues should steer to Scotland, the proposed microelectronics investment of about £50 million which the National Enterprise Board is considering.

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Briefing

Survey of micro costs

ALTHOUGH the cost of microprocessors is now less than £10 a unit, development costs necessary to ensure an end product can be as much as £50,000. This is one of the conclusions of a survey carried out by the Electrical Research Association for about 50 clients in the UK and overseas.

The survey showed that although costs appeared high, the market potential for well-developed products was vast. Details of the project are being issued to participant companies in four volumes, two of which have already been published.

Slowdown

PROFITS at IBM will be reduced by a slowdown in the rate of outright sales of hardware this year, according to chairman Frank Cary. Over the past two years, turnover from outright sales has risen 50%, while rental income has grown only 12%. Cary also denied suggestions of a reorganisation within IBM, and said that he intended to retire in 1980, when he will be 60.

Business mini

THE second meeting of the Conservative Computer Forum, a group of high-level MPs (CW, June 18, p. 10) was held last week to discuss the state of the industry, and some strongly opposing views were expressed.

Conservative MP Michael Johnson, strongly attacked government efforts to promote the sales of software, but also criticised the government's approach to the industry. He recommended the abolition of the support programme for small businesses, which he said was "a waste of money".

Johnson also criticised the government's approach to the industry, and said that he intended to introduce legislation to give small businesses a 10% discount on VAT.

Takeover

THE firm that provided shares and stockbrokers with information on European and Irish stock exchanges, Inter-Broad Services, is being acquired by Diageam International.

Amdahl at Chrysler

ACQUISITION of Amdahl Corp. by Chrysler is under way, according to a spokesman. The deal, which would give Chrysler a 50% stake in the company, is expected to be completed by the end of the year.

Register call

THE British Association of Engineering Technicians (BAET) has announced that it will be holding a conference on the subject of "The Role of the Engineering Technician in the 1980s" on September 12-13 at the Royal Society of Arts, London.

Hardware

THE small business system has become one of the fastest growing of the computer market with sales rising from £100 million in 1976 to £1.5 billion in 1977. This growth is expected to continue in 1978, with sales reaching £2 billion.



Varley

At last—politicians wake up to micros

AFTER several years of benign neglect, the computer and microelectronics industries have been rediscovered almost overnight by politicians of all parties, but the imminent General Election threatens to submerge the debate in a welter of party political infighting.

In the past week, Tory Industry spokesman Sir Keith Joseph has written to Industry Minister Eric Varley questioning the wisdom of the National Enterprise Board plan to set up an integrated circuit company; Lord Privy Seal Lord Peart delivered a major speech on microelectronics; and Minister of State for Industry Alan Williams stressed the need for digital technology in telecommunications.

Sir Keith's letter underlined opposition of the sector working party of the National Economic Development Office to the NEB plan, and asked whether the UK could get 64K RAMs on the market in time to be competitive. His scepticism seems to spell doom for the NEB's plans should a Tory government be returned at the anticipated October election.

In his reply to Sir Keith, Varley said the questions posed were either preposterous or depressing, and he eagerly criticised the suggestion that Britain should not seek to develop "wealth-generating, employment-creating industries based on new technology, but sit back and be content for the US and Japan to dominate the market."

Varley is due to announce awards under both the microelectronics and microprocessor applications support schemes this week (CW, February 16). Despite the fact that a Tory victory in any future election is likely to mean the end of government money for the

development schemes, the Electronic Components Sector Working Party of the National Economic Development Office has asked the Department of Industry for much more money to support UK microelectronics (CW, May 4). In a report to the Department, the working party calls for a fundamental change in the DoI's original plan to support multi-application "standard" circuits.

A total investment of about £240 million is sought, with £80 million of that coming from the DoI. This is more than three times higher than the original sums suggested by the Department (CW January 19). The funds would be split between support for special circuits — the DoI's original area for support, and the new area of multi-application circuits.

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Joseph

Tories asked to abolish Insac export division

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ICL introduces insurance package

WHAT is claimed to be the most effective insurance package available has been introduced by ICL in response to demands from its customers. Underwritten by the Eagle Star Group, the package covers the cost of replacement data and other equipment in the event of fire, theft or damage.

IBM pulls out of Nigeria

FOLLOWING its withdrawal from India this month (CW, June 18, p. 10), IBM has decided to pull out of Nigeria rather than submit to government directives to sell 40% of the local subsidiary to Nigerian nationals.

As in Indonesia, where IBM also closed down its subsidiary, the company intends to sell its business activities to a locally-owned company which would provide maintenance and perhaps also continue the marketing of IBM products on Nigerian territory.

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Gamma sets up Series 1 firm

UNDERLINING the threat posed by the IBM Series 1 to the traditional minicomputer suppliers, Gamma Associates, of Nottingham, has announced its intention to set up a new company, Digital Equipment Hardware, to establish a new company, within the group to market Series 1 systems.

Meanwhile IBM has announced significant enhancements to the mini, including plans for a Cibo compiler, and extensions to main and disc storage.

Key element in Gamma's

strategy is the COS/1 Cibo operating system developed by Computat Systems Inc. of Westport, Connecticut (CW, February 16). Gamma has exclusive UK rights to COS/1 and the associated ANSI Cibo compiler, and will be selling the software for about £9,000 with discounts for quantity orders.

"We have sold over 100 DEC systems and expect to go on selling them in large numbers," Dr George Coggan, managing director of Gamma, emphasised to Computer Weekly.

"We felt we needed Series 1 to get access to a number of large IBM users who refuse to buy hardware from any other company. Also, Series 1 is such a significant extension to the minicomputer business that we cannot afford to ignore it."

There are no OEM discounts on Series 1, which means that companies like Gamma cannot make money by selling the hardware. Nevertheless the company aims for sales of at least 50 systems in the next 18 months.

COS/1 is an interactive multi-task, multi-user operating system which fits into 26 32K-bytes, supports local and remote terminals and a background batch stream. Computat has

● Turn to page 2

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This month marks the tenth anniversary of the shooting of Andy Warhol by Valerie Solanas, for whom SCUM stood for Society for Cutting Up Man. In this Quasi Computerview, Professor DONALD MICHIE, of the

Mechina Intelligence Unit at Edinburgh University, warns that, when people are chronically and massively deprived of jobs, the same moods of alienated frustration as those expressed in Valerie Solanas' SCUM

Manifesto could build up quickly with terrorism, racial slaughter and war not excluded in some social circumstances. SCUM would then stand for the Society for Cutting Up Machine-makers. . . .

Beware SCUM—the Society for Cutting Up Machine-makers

WATCH out for SCUM! I am not referring to the latest oil slick. The acronym SCUM was originally coined in New York by the tragic paranoid Valerie Solanas who, on June 3, 1965, shot Andy Warhol.

For her, SCUM stood for Society for Cutting Up Men. With brilliant intensity her SCUM Manifesto propounded the bold idea of exterminating the male of the human species, thus freeing the world's women to develop their own destinies. Her idea was to fill the gap with machines.

My mind went back to poor Valerie's diatribe while reading Colin Hines' 'The Chips are Down' (25p from 40 James Street, London, W.1) published recently by Earth Resources Research Ltd. I realised that a new kind of craziness may one day be sparked off — not man-hating but machine-hating. In seven terse and sombre pages the author warns that computer-induced mass unemployment may attain disaster proportions in Britain, and certainly will do so if a major national effort to analyse and cope is not mounted.

Hines argues that it is the microprocessor which is suddenly turning dreams into threatening reality.

What happens when people are chronically and massively deprived of jobs? My reading of history is that the very same moods of alienated frustration as those expressed in SCUM can build up quite quickly with terrorism, mass hooliganism, racial slaughter, and war not excluded in some social circumstances, as first outlined, SCUM this time will stand for Society for Cutting Up Machine-makers.

Luddism never yet turned back the industrial clock. So other responses will have to be found to such facts as the following:

- Micro-automation has already shattered the Swiss watch industry.
- In 1970-75, National Cash Register reduced its manufacturing workforce by more than 50%.
- In 1970-75 US Western Electric's manufacturing force dropped from 39,200 to 19,000. A 75% cutback is additionally expected in fault-finding, maintenance, repair and installation.
- Similar trends are now apparent in the service industry through micro-automation in supermarkets, in the garment trade, in offices, in design shops and elsewhere.
- Overall, unemployment in Britain is projected at the level of 8.5 million by 1990.

Hines also takes note of the growing impact of the reprogrammable robot. Private

viewers will recall my recent references to the mushrooming US robot manufacturer Unimation (CW, May 11). The job application form shown has been filled in on behalf of a Unimate robot. The corporation puts it out as a promotion gag. But the joke has disturbing overtones. Valerie Solanas' fantasy of replacing male persons by machines acquires a hint of feasibility — but females are equally vulnerable. A recent Times article described a word processor as "The four thousand pound typal-substitute that will soon pay for itself."

Where do we stand as computer people? We started it, didn't we?

The situation is more acute because there are not one but two problems building up: (1) job-destruction, (2) the need to fight overseas competition both by modernising our own plant and by developing automation systems for sale overseas.

Yet (2) seems to aggravate (1). Well may Hines say "There will be no easy, wand-waving solutions".

All that a computer man can do is to see if his own professional skill can be brought to bear on some sector of the problem. For example, contributing to "the human interface", so as to make obscure brute-force computations more comprehensible to the machine's supervisors, is clearly one of the more constructive directions. Allied to that, the whole area of computer-aided education and training acquires a new, and especially beneficial, significance.

One must sympathise with union praesuroa for further

shortening the working week. None the less, I prefer the "four-plus-one" day to the "four-day" week. The "one" stands for all-day educational release at employers' expense. Such a scheme would generate work for the education industry, which itself can absorb with benefit indefinite amounts of automation to augment, not displace, instructors.

If we computer men do not concern ourselves about the good and evil we sow, then a day may dawn when we do indeed have to watch out for SCUM!

REFERENCE: "SCUM Manifesto" by Valerie Solanas, New York: Olympia Press, 1968 (paperback).

APPLICATION FOR EMPLOYMENT

NAME Unimate 2000 g SOCIAL SECURITY No. None
ADDRESS Shelter Rock Lane, Danbury, Connecticut 06810
AGE 300 hours (by software extension) - 15,000,000 hours
SEX None HEIGHT 5 ft. WEIGHT 2,800 lbs.
LIFE EXPECTANCY 40,000 working hours (20 man-shift years)
DEPENDANTS Human employees of Unimation Inc.
NOTIFY IN EMERGENCY Service Manager, Unimation Inc. (203/744-1800)

PHYSICAL LIMITATIONS Dumb, blind, no tactile sense, one errod, immobile
SPECIAL QUALIFICATION Strong (100 lb. load), untiring 24 hours per day, learn fast, never forget except on command, no wage increase demands, accurate to 0.05" throughout sphere of influence, equitable despite abuse

HISTORY OF ACCIDENTS OR SERIOUS ILLNESS Suffered from Parkinson's Disease (since corrected), lost hand (since replaced), lost memory (restored by cassette), hemorrhaged (sutured and fluid replaced)

POSITION DESIRED One cast machine operator

OTHER POSITIONS FOR WHICH QUALIFIED Forging press, plastic molding, spot welding, arc welding, peeling, machine loading, conveyor transfer, paint spraying, investment casting, heat treatment, etc.

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RELATIVES IN THIS PLANT Five 2000A Unimates in forging department

LANGUAGES Record-playback, assembly, Fortran

EDUCATION On the job training to journeyman skill level in all jobs listed above

REFERENCES General Motors, Ford, Caterpillar, Bobcock Wilcox, Xerox and 85 other major manufacturers

The job application form on behalf of a Unimate robot

Ten-year chess bet nearly over

The 10-year period of David Levy's computer chess bet expired at the end of August. In August, 1968, Levy started a bet, now ending in £120, that no computer program would win a match against him within 10 years.

The final match which will determine the outcome of the bet will be played during the last few days of August. The exact venue has not been decided but Holland, Canada and the US are the most likely countries to host the event.

There may need to be more than one match and they may take place at different locations. A warm-up game is planned for July 25 against a program which will most likely run the Cyber 178 of CDC's plant at Arden Hills, Minneapolis. Arrangements for this have still to be confirmed.

Computer fraud conference

A CONFERENCE on computer fraud and its prevention will be held in the Hilton Hotel, London W1 on July 4. It is subtitled 'The Prevention of Computer Use from Plagiarism and Abuse'.

Speakers will include Colin Tupper, Fellow Tutor in Law at Middlesex College, Oxford; Bill Dunn, UK managing director of Panophic Systems UK; and Michael J. Comer, corporate security co-ordinator of Esso.

Further details can be obtained from the organisers, European Study Conference Ltd, Kirby House, 31 High Street East, Uppingham, Rutland, Leics LE15 2PY, tel. 057 282 2711.

Gamma sets up Series 1 firm

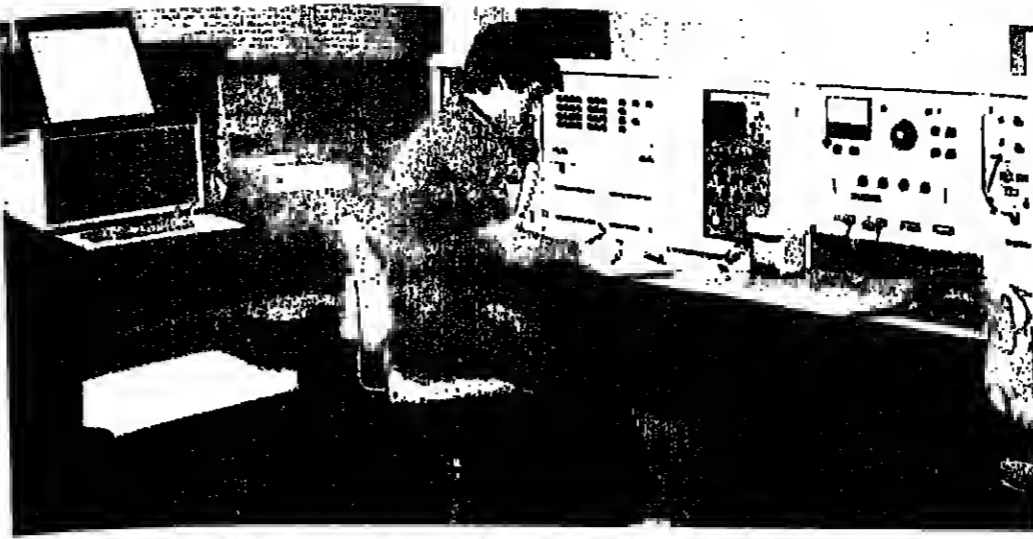
From front page already installed eight systems and has another 100 copies of COS/1 in order. Gamma gets its own Series 1 in September.

IBM has now announced its own Cntrl compiler for delivery in the third quarter of 1979, which will be compatible with 370 Cobot and costs £2,365. A new processor, the E model, with faster, high density memory has been added.

A disc subsystem with capacities ranging from 58 to 258 Megabytes will be available next spring, as will a floppy-disc magazine unit which takes 23 disquettes. Software enhancements include facilities to exchange data with 370 mainframes from the 135 upwards, and a Structured Programming Facility which allows TSO users to offload editing from the mainframe to Series 1. A two-channel switch has also been added, enabling Series 1 input-output channels to be switched between two processors.

Ten years ago...

COMPUTER WEEKLY JUNE 27, 1968
TEDDY Thins chose a computer motif to decorate some of his premises which coincided with the first ever Open Wimbledon... Computing power intended primarily for software development in data communications was installed in a new wing at English Electric's Kidlington factory... Plans were being made by the London branch of the BCS to provide members with a series of meetings in the suburbs... Following a recommendation made by the Hotel and Catering Economic Development Council, groups of hotels linked commercially or geographically were to install computerised reservation systems... A data communications network that could be the basis for a national system was to be established within the National Physical Laboratory at Teddington.



EPSS consists of Ferranti Argus 700-based packet-switching exchanges in London, Manchester and Glasgow. Our picture shows the network service centre at London exchange.

EPSS open day shows UK well up with overseas rivals

A DRAMATIC transatlantic three-network link, demonstration of a new low-cost graphics system, and access to the BBC Ceelax text display system over a computer network were among the features of the first EPSS Users' Open Day last week. The advent of X25 networks has tended to push EPSS, the Post Office's Experimental Packet-Switched Service, into the background, but the demonstrations made it clear that in terms of network usage, UK

research institutions are right up with their counterparts overseas.

Steve Treadwell, of University College, London, demonstrated network interconnection by establishing a link through EPSS via the big experimental US ARPA network to a computer in Los Angeles. An experiment on a third network, Satnet, was conducted from the Los Angeles computer which involved connections via the Intelsat IV satellite to computers in Boston, Oslo and London. Satnet is an experimental network with ground stations in Goshilly, Cornwall, in Sweden, and in Virginia, US, and the purpose of the test was to measure the amount of time which data transmitted on Satnet spends in each ground station.

Dale Sutcliffe of the Atlas Division, Rutherford Laboratory, demonstrated that packet-switched networks could be used for graphics work by using EPSS to run a demonstration of a graphics package, Graphic Option Controller. GOC is a microprocessor-

based raster scan display generator which enables an ordinary alphanumeric VDU to be used for graphics work. It was developed at Surrey University and is marketed by Sigma Electronic Systems.

In the demonstration it was used in conjunction with a GEC 4070 computer installed at Rutherford and linked to London via EPSS.

The National Physical Laboratory showed a number of demonstrations involving connection of EPSS to its own in-house network. Among the demonstrations was network access to the BBC's broadcast Ceelax teletext system for putting up text on a TV screen. NPL has developed an interface which takes the decoded signal from a standard teletext receiver and translates it into a character stream.

Open day demonstrations were given at five centres: Glasgow University, Rutherford Laboratory, Harwell, National Computing Centre, Manchester, University College London and Sperry Univac, London.

Scicon and NPL develop system based on micros

A MULTIPROCESSOR system, based on a chain of microcomputers that can be extended almost indefinitely, is being developed by Scicon in conjunction with the National Physical Laboratory. The project is being supported by a £30,000 grant from the Advanced Computer Technology Projects fund and a further £30,000 from Scicon.

It is planned to have a prototype of the system, known as Demos, ready next year and first application areas are expected to be in real time control, transaction processing and communications.

The basis of Demos is a high capacity communications link capable of connecting up to 250 different micro or minicom-

puters. This is an 8 Mbyte parallel ring managed by small, identical software kernels resident on each machine. These are written in Concurrent Pascal. Only the interface between each computer and the ring must be specialised for the needs of the particular type of device used.

Demos systems software is written as a single program. Once compiled, an independent system generation program allocates its components among the individual computers for loading. In this way a program can be reloaded on larger or smaller configurations without change. The systems software can be written to support particular applications, and application programs can be written in a different real time language, and may be compiled separately.

The system will be particularly suitable for large scale applications where many activities are taking place in parallel. Fast file access will be possible by dividing databases on a disc-per-computer basis, and powerful real time simulations will also be possible by modelling each part of the simulated system on an individual computer.

Newcastle Council to stay with ICL

AFTER putting the matter out to tender, Newcastle-upon-Tyne City Council has decided to stay with ICL and ordered an ICL 2970 in preference to an IBM 3031 system. The 2970 is to be delivered in October.

It will replace the present 1904S, and provide the power and facilities needed to implement an integrated financial, land, property, personnel and housing management system, probably using ICL's IDMS database management system.

Running under VME/B, the 25 Mbyte system will also support a communications network that will feature 39 cash receipting terminals handling

housing rents in 26 offices; an ICL 7502 terminal processor supporting eight display terminals for program development; another 7502 handling communication and vaccination record inquiries; and various other terminals in schools and the engineer's department.

INTERRUPT

SOME years ago a large company installed its first computer. It had bid its time to ensure that the equipment really had the necessary throughput capacity, with efficient software and systems and adequate peripherals.

The first and biggest job was sales invoicing, 10,000 invoices a day to 250,000 delivery points. A considerable customer master file was set up, and after only 125 program trials, the system seemed able to update this large and complex file.

All went well for a month — then disaster. Everything stopped for a store parity failure. Ke-run — parity failure, again; change tape deck — parity failure; read the offending record — manually, which happened to be that for Elstree Rural District Council — parity failure. So engineers descended from far and wide and laboured for three days and nights. And the conclusion? A design fault triggered by the bit pattern of that particular record.

It is worth noting that the computer that has been so carefully chosen was the third of a new and very advanced series.

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© This week's £5 interrupt price goes to M. C. Hancock of Barchingham, Warr.

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Electronic music festival

MUSIC of 40 modern composers will be featured in the 1978 Edinburgh Festival of Electronic Music, to be held between August 31 and September 5, coinciding with the Edinburgh Festival.

The Electronic Music Festival is sponsored by the Edinburgh Arts Society (Edinburgh) in association with Radio Forth (Glasgow) and the Scottish Arts Council.

Tickets for the six concerts are available from the Edinburgh Fringe Festival Society, Box Office, 188 North Street, Royal Mile, Edinburgh.

DOWNTIME

by Chad

Nationalist exiles

IN conversation the other day with Gerry Fisher, ebullient ex-president of the BCS, I discovered that he is also president of the London branch of the Scottish National Party.

I have spent several days now struggling to get my mind round the idea that there could actually be a London branch of the Scottish National Party.

I keep imagining that next I will hear of a Cairo branch of the World Zionist Organisation.

I suppose it's just one of those numberless contradictions that seem, in an

endeavouring way, to characterise these amazing islands on which we live.

● The newly formed conference company, Information Studies Ltd has taken up residence in the grandly-titled Regal House in Chorleywood, Herts. But for the time being they are without a phone, as the Post Office has having trouble getting them lines quickly. Which is strange, as Regal House used to be the local telephone exchange.

Noise of your choice

DOES silence get you down? Are you a founder member of Peter Simple's Friends of Noise? Then they have just what you need at Hammacher Schlemmer, the New York emporium of things for The Man Who Hss Everything.

It is an electronic sound conditioner, called Environmental Sound X, and it consists of a box that just sits there and makes noise. You can select white noise, random noise effects, the sound of single waves breaking, light rain, a steady downpour, or a waterfall. You can even, if you wish, switch it off.

All this is meant to aid relaxation, or concentration at work, and only costs \$129.95.

Do not scoff at Ysnkee Ingenuity—it makes money. In some American joke boxes you can put in a quarter and choose a record that gives you two and a half minutes of silence.



Poets' Corner

ONE of the fringe benefits of being director of the National Computing Centre, as is David Firnberg, is that you get to present bouquets to award-winning poets. Firnberg is seen above with the finalists in Wordplex's Operator of the Year competition for word processing typists.

Mrs Lesley Draper won the award for her dactylagrophic expertise, and for writing the following poem:

I glide through the words now with the greatest of ease,
As they form on the screen at a touch of the keys,
I can change them, arrange them, save or delete,
Form letters from phrases... Wordplexing's so neat!

I am sure you will agree that Pam Ayres must lack to her laurels.

By the way, there is no truth in the rumour that David Firnberg is to judge the Miss World contest next year.

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'Adapt to computers or face disaster'—MP warns

UNLESS political and economic institutions equip themselves to use the techniques and capabilities offered by computer technology, society could be faced with disaster.

This was the main thesis of a talk by Conservative MP Ian Lloyd, when speaking at the "Computers and Peripherals—1980 and Beyond" conference at the US Embassy, London last week.

Lloyd, who is chairman of the House of Commons Science Sub-Committee, opened the computer seminar with a talk entitled "The Political Control of the Silicon Revolution," but was himself dubious that any such control should be exerted.

In fact he suggested that as there was a great danger of the wrong political decisions being made due to a lack of awareness of the

situation, it would be better for the government to sit tight and do nothing.

"The government must not promote false confidence," said Lloyd. "They must not get in the way and stifle what industry may do. If this does occur, people will not tolerate it; they will react irrationally or even possibly violently. It is profoundly important that they learn more about technology. The Japanese have realised this, as have the Americans, who have always had a passion and flair for technology."

But one of the difficulties in achieving such an admirable state of affairs was that there were two schools of thought, both giving contradictory advice, he added.

"There are those who think the techno-

logists are crying wolf," he said. "They look at past events and point out that society has taken them in its stride despite famine, world war, and other slumps."

"Then there is the apocalyptic view where people say that we are approaching an 'event horizon'—a discernible black hole in technological space. They believe that we have little time to come to terms with the problems. . . . I am inclined to this latter view."

Other speakers at the seminar included John McNulty, managing director of Modular Technology, who described the advances we may see in computer peripherals during the 1980s; and Gordon Scarrott, manager of ICL's research and advanced development centre, who outlined the "Effects of Merging Logic and Memory in the 80s."



LLOYD... "better for the government to sit tight and do nothing."

NEWS IN BRIEF

Philips to build 2,300 minis at Rambouillet

THIS year Philips plans to build 2,300 P800 series minicomputers at its Rambouillet plant, near Paris. Half of the output will be fully configured minis for use in process control and other applications; the remainder will be shipped to Sweden for incorporation into PTS 8000 banking terminal systems.

Four in five of the minis made at Rambouillet go for export, while imports of components for their manufacture amount to only 30% of their value.

PO policy change

WHEN a Post Office policy change takes effect in July, it will no longer be necessary to rent an additional exchange line for each leased line point. The Post Office considers its moderns are reliable enough to do without a remote test facility for PO engineers.

Prime time

TO provide a time sharing bureau service for structural and civil engineers, a Prime 500 system has been installed by Fibre Computer Operations of St Albans, Herts.

Division may close

THE plan for Cincinnati Milacron to sell its commercial systems division to CSD International, a company set up by Milacron employees (CW, May 18) has foundered because agreement could not be reached on price. Cincinnati Milacron's business systems division, set up to win a wider market for the minicomputers, which the Ohio-based company builds to control its machine-tools, is now likely to be closed down.

Belgian order

ORDERED 18 months ago, two NCR Criterion 8570 mainframes have been installed at the Belgian Finance Ministry, where they will replace two NCR Century 200s at a lower cost. Applications include income, property, company and motor taxation and are being developed in Cobol 74. The order was in competition with NCR, CII-HB, Univac and IBM.

MS profits

FINANCIAL results published by MS for its financial year ended April 30, 1978, include revenue of \$183 million and net profits of \$7,250,000, compared with revenue of \$146 million and \$1,850,000 in the previous year.

Printer approval

A microprocessor-based printer, the PACT 200 from IBM, has received Post Office approval for linking to the PACT 200 network. The printer comes in several ver-

Fujitsu gives details of 'most powerful system'

SOME details of the world's most powerful general purpose computer, the Fujitsu M-200 have been clarified by the company.

Fujitsu now says that the M-200 CPU is an enhanced version of the M-190, which is effectively an Amulad 470V/4 with 10 extra instructions, and that multi-processor versions of the M-200 are configured with each processor having its own memory, rather than all memory being common. The M-200 is available with up to four processors and a theoretical maximum main memory capacity of 64 Megabytes. However, Fujitsu says that the capacity of the registers limits this to a practical maximum of 32 Megabytes.

In maximum configuration, the M-200, which will be available in Europe from Siemens, is claimed to offer five times the power of an IBM 3603 minicomputer.

Fujitsu also says that its new large-scale LSI/FI operating system is "object and source code compatible with programs written to run under IBM's MVS, implying that such programs can be transferred to a machine running under OS/VF4 without recompilation."

The fact that IBM operating systems are made available by the company without restriction

on the hardware on which they are run, raises the question of why Fujitsu should bother to develop its own version of MVS. The reason is that it is apparently illegal in Japan for a user to run an IBM operating system on a non-IBM machine.

Fujitsu's partner in the M-series, Hitachi, has not yet announced its own forthcoming supercomputer, which is claimed to be even more powerful than the M-200, and will be added to the AS series as the AS/7. However, it appears that the Japanese trade and industry ministry MITI has vetoed the official name of M-210 that Hitachi wanted for the machine.

Unaudited figures from Fujitsu for the year to March 1978 indicate that turnover has risen sharply and now stands at almost exactly £1,000 million at the current rate of exchange for the Yen. The turnover of 387,400 million Yen shows an 18.3% advance over last year's 327,969 million Yen. Fujitsu recorded a pre-tax profit of 13,500 million Yen, down from 18,000 million Yen last year, and representing a margin of 3.5% of turnover. For the current year, Fujitsu is projecting further strong advance in sales, looking for 447,000 million Yen, on which it hopes to make 14,000 million Yen in pre-tax profit.

UK group to study online query languages

A NEW group has been formed in the UK to study online query languages.

The chairman, Roger Tagg, of Scienn, says that there are already about 100 such languages available on various computers, and with an standard syntax or style in existence, there is an urgent need for a framework for future developments.

One aim of the group's work will be to specify a range of standard function types which any language should contain. This would then act as checklist for those designing or evaluating query facilities.

A standard syntax, Tagg pointed out, would fall outside the scope of this work. Users themselves should choose the precise form of dialogues, which

can in general be constructed later, for example by using macro facilities.

The group which has already met twice, is likely to affiliate to the BCS Information Retrieval specialist group. The latter is predominantly concerned with bibliographical systems, in contrast with the new group which will consider information retrieval more generally, including database and data analysis systems.

The group has set itself the objective of publishing a report during 1979. This will cover relevant aspects of the user-computer interface and will also categorise the languages currently available, distinguishing for example those which are syntax driven from those using prompt/response techniques.

'Prime targets in a strike'

GOVERNMENT computer centres, particularly those involved in revenue collecting, would be prime targets in strike situations. This view was put forward by a spokesman for the Civil and Public Services Association, who refused a comment on the Civil Service Department review of computers in central government that had been attributed to

the association (CW, June 8). He said the CPSSA agreed to the main with the view put forward in the report. "The use of selective strike action has been, and will continue to be, one of the major effective means of applying pressure to the employer after negotiations have broken down," he said.

Honeywell gives 50% boost to Level 62

THE average system performance of Honeywell Level 62 computers has been boosted by about 50% with the introduction of a respecified processor, 200 Megabyte disc drives, transaction processing system and 16K hit memory chips. These have enabled the maximum main memory size to be doubled to 512K bytes.

At the same time, Honeywell has announced the biggest Level 62 order yet in the UK. This has been placed by NEI Mechanical Engineering which is decentralising its data processing operations by replacing an IBM 370/145 at Gatehead with seven Level 62s. These will be installed at localities all over the country.

The transaction processing system announced by Honeywell for Level 62 is called TIPS and, according to Honeywell, it occupies less memory than most available packages while affording faster terminal response times.

The boosted transaction processing capability of Level 62 should make it a stronger competitor for the IBM System 34 and the bottom end of the projected E Series from IBM.

The 200 Megabyte disc drive introduced for Level 62 is part of a new family of disc stores called Large Storage Module Drives, LSMD, manufactured by Magnetic Peripherals Inc. This is the firm in which Honeywell has a large minority share, the majority being held by Control data.

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GILB'S MYTHODOLOGY

How to specify all your project goals in measurable form

THERE is the tale of the intoxicated party-goer seneschaling on a well-lit street. A passer-by starts to help him to find the wench he has lost. After half an hour, the passer-by asks: "Where exactly did you lose the wench?" "In that dark alley to the left," says the party-goer. Exasperated, the passer-by demands: "Well, what are we wasting our time looking for it under this street lamp for?" Our tipsy friend replies, with frightening logic: "Because it's lighter here!"

Things that are more important to the success of the project, like reliability, maintainability, portability, ease of user learning and recoverability of files, for example, will typically be unspecified. Or at least the specifications will be so unclearly specified as to be worthless.

For example, a bank real time project, where the hardware supplier was committed to writing 200 terminal sub-routines, had this maintainability specification: "Our maintenance programmers shall be able to maintain the programs." I would ask: If they find a bug that's stopping the online system within two weeks, is the system meeting the maintainability specification?

Jerry Weinberg created the

Zeroeth law of reliability, which goes something like this: If you don't care about the reliability goal of a project, you can meet any other goal of the project. Which is another way of saying that if you don't care to measure whether the system works properly, you can deliver it yesterday. If, however, you want it to work perfectly, your user may have to wait forever.

In the real world, you and your user are going to have to reach a compromise. And that will require clear, quantitative and practically measurable definitions of the reliability concept.

I tend to think of a computer project as a boat with some random holes in it. Some holes are below the waterline. If we don't plug

them all, we risk sinking. If we only manage to plug most of them, we are going to have to do a lot of work getting rid of the water in the boat. If we plug holes above the waterline ("non-critical goals"), instead of the ones below, we may sink while we are plugging the wrong "goals".

In my experience we are all guilty of plugging holes above the waterline, and stuffing pieces of bread into some of the critical holes. As an example of the latter, I'll bet that few readers ever define a measurable goal (not a technique which you hope will get you some result) for maintainability of programs. I'll bet that you have been stuffing breadcrumbs into that hole (structured programming, modularity, comments, indentation,



documentation). At all computer installations I have visited I have never been shown details of any past or present project, where all critical goals are stated in quantifiable and measurable form.

I find this state of affairs incredible. Data processing is management without objectives. In some areas of system quality we are in such a poor state that we don't even know a realistic level of an objective because we have never even measured the levels at previous projects.

Enough of this criticism. I have been as guilty as anyone. But I have tried to mend my ways. And I find great interest and ability among my clients and course participants for the exercise of setting formal quantified goals for projects. It takes one to six hours of work in plan down eight to 16 goal areas.

You might even do it for projects already under way, but you should start now to practise it for new projects. How else can the manager manage the project?

We fill out a "metrics matrix" as one colleague dubbed it. Along the vertical axis we list the dozen or so most critical high level goals. If you have more, you are probably listing too detailed goals: this we do later by "exploding" high level goals ("security") into more detailed goals (file security, fire security, emergency security, etc.).

Then along the horizontal axis we fill out parameters describing our critical goals: measure to be used, planned quantitative level, worst acceptable case level, best imaginable case level, priority, "more important than other goal", and finally a reference to the authority documentation for defining this goal and its levels to be high priority.

As Lord Kelvin once said, if you can't quantify your knowledge, then it is of a meagre and unsatisfactory kind. We find we can satisfactorily quantify all critical goal areas, and then use them to design the system. Try it now!

PROGRAMMER NOTES

Advantages of a file handling library

FILE handling is such a basic component of programming that most people tend to use manufacturers' routines. But a home-made file handling and record handling library can offer a number of advantages, particularly where the standard facilities are limited or awkward to use.

Consequently Programmer Notes presents some ideas on a do-it-yourself I/O library.

The routines should be written in assembler and stored in a separate system library to be linked in with applications programs at LOAD time.

The routines likely to be used most often are those dealing with opening and closing files. Suggested formats are OPEN (unit number, file name/ password/ owner/ no account name, location, access method, new or old, READ/WRITE privileges, expiry date, status); the CLOSE routine parameters will be a subset of those with an additional retain or destroy parameter.

The file name may be supplied by JCL, by the user or operator in response to a program request, taken from a file, or even generated by the program.

However supplied, the name will be in text format and needs checking for illegal characters. Remember too that the user's terminal or card deck may be a valid file "name" default and should be allowed.

Passwords need similar validation and any account numbers should be checked. This helps to see whether a user is trying to create a file in an account other than the one he is using.

Although location of the file will default to primary disc storage, users should be allowed to request a tape or other secondary storage. The identifiers should be checked for basic validity, and any operator messages produced.

The access method parameter should allow for the file to be created as a new existing one be used as a keyed, random or sequential. When a file is to be read it may be possible to treat a keyed file as sequential. This means that when the OPEN or CLOSE request has been satisfied by the system, the file's access method type should be checked back with the initial user request.

System performance aid in Shadow II update

FORTHCOMING enhancements to Altergo's Shadow II TP monitor include two major new facilities developed by the company in the US. Energetic marketing in North America, including the opening of eight regional offices earlier this year, has already given the product around 70 US users.

One of the new facilities is a tool for predicting online system performance. Based on a model of the proposed system, the

Puzzler

TRY this one in your head: A climber walks up a mountain slope at 315 rpm, and down again at 44 rpm, taking six hours in all for the double journey. How many miles does he walk? See page 40 for solution.

software will yield statistics on such parameters as resource utilisation and response time.

The other facility, Online Mapping, already has some 20 users in the US. Based on a special map file, which stores map details, the subsystem is claimed to result in an average 30 per cent saving in overall programming and testing time for TP applications.

Fully interactive, Online Mapping eliminates the need to compile map definition programs, and checks for incorrect specifications, flagging the errors.

The system enables an existing map to be recalled to the screen, from where it can be easily modified or used as the basis for creating a new map. A chargeable option, Online Mapping costs £2,400.

SOFTWARE FILE

Basic Timesharing reveals details of access protection feature

TWO system software packages and an online accounting system for Basic Timesharing's BTI-1000 machines are being marketed in the UK by Cara Consulting. At the same time, Basic Timesharing has revealed a unique proprietary account feature which protects installed vendor's software from unauthorised access.

Cara's Mibus system, developed in the US by DLM Enterprises, is an integrated accounting and inventory control package. Based on a network of direct access channel files, the system is available for updating all linked files automatically when a transaction is entered.

The system handles a comprehensive range of functions including general ledger, order entry, bill of materials, job costing, and invoicing. Little batch processing is performed, except for example such functions as producing statements.

Offered in the US largely through bureaux, the system has about 70 US users.

Cara's other two offerings, also developed for updating all linked files in their capabilities and are sold there in competition.

Minds, a database manager and report generator, incorporates a high level command language and searching and sorting facilities. Like IBM's Brads (Software File, June 15) the system includes a data dictionary controlling application program access to files.

The other application development tool, Mars (Multiple Access Retrieval System) provides file handling facilities based on an indexed sequential access

method. It is designed for use by end-users as well as application programmers, providing means of defining and creating files and also updating and retrieving stored data. Both packages provide for multiple concurrent access to files.

Said to be unique, the proprietary account feature on the BTI 4000 allows software suppliers to licence the use of software without allowing access to the source code.

The protection is provided by the account structure of the operating system. Programs held in a secure account cannot be accessed without supplying a high-level password, which is held in the operating system software.

The technique is feasible because Basic Timesharing permits only very restricted access to its system software, forbidding examination of the operating system either in core or on disc.

An interesting aspect of the facility is that it still permits the software vendor dial-up access to the system, so that he can maintain and update the package from his own office.

Real time monitor for MVS

A real time monitor for IBM's VSI and MVS operating systems is the latest Value Computing product to be released in the UK by RTZ Computer Services.

SMT (Systems Management Tool) provides real-time display of resource utilisation, permitting systems programmers and those responsible for production to fine-tune the system. A unique early-warning mechanism is also provided, that notifies the user of pending job time-outs and allows the time to be reset. SMT is priced at £2,800.

Telecomputing confirms VME interest with order

WITH an order for an ICL 2950 system, Telecomputing has confirmed its commitment to develop TP software for VME/K and VME/B users. The new system will be used initially for the development of TPS Care under VME/K (CW, October 6, 1977).

The primary aim of TPS Care is to ensure that existing TPS users enjoy complete software portability from 1900, 2903, and 2904 systems to the 2900 environment.

In support of this goal, the company has set three specific objectives: to present an unchanged user terminal interface; to provide the same user programming interface; and to provide additional code in any areas where the standard operating system falls short of current TPS facilities.

TPS Care will inevitably be a higher level product than current TPS versions, as many of the existing functions should be

handled by the operating system, said the company.

One of the first tasks on the new machine will be to validate the basic transaction processing facilities in VME/K, scheduled to appear in version KSV-18 of the operating system next March.

This release should coincide with the delivery of the 2950 to Telecomputing's Oxford headquarters, also planned for March, 1979.

First deliveries of TPS Care for VME/K are expected around autumn 1979 and will be followed by a version for use with VME/B. A common TP Interface has been promised by ICL for the two operating systems, notes the company.

In addition to catering for the development of TPS Care, which will be written in SFL, the new machine will be used to provide a VME/K bureau service.

LUCS library updates

RECENT additions to LUCS' software library include a program for optimising microwave circuit designs, on upgraded version of Ansys, and a set of 30 US programs for structural engineers. All are offered as part of the bureau's interactive service.

Designed to analyse the performance of complex high frequency circuitry, Compact features a built-in databank describing the characteristics of the most widely-used devices. The program has five main functions: circuit and stability analysis; sensitivity and analysis; optimisation; and the generation of data for two-dimensional error contours.

Revision 3 of Ansys, the popular finite element analysis system, enhances areas including element handling, non-linear capabilities, input, output and graphics processing.

Systems Professional, also known as Sys Pro, is a library of software developed in the US to meet the needs of a company in the areas of structural analysis and project management. Widely used in the US, it includes the well-known Stress program for the analysis of large and complex structures.

Time sharing system that Offers 'TSO for OS/VS1'

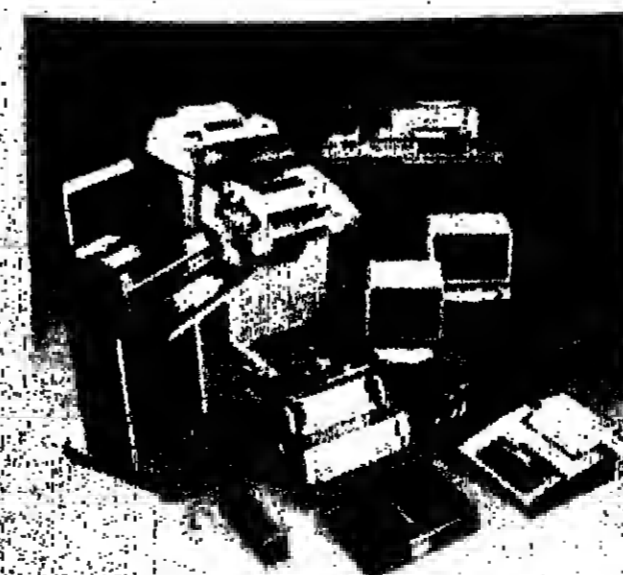
A TIME sharing system described as an implementation of TSO for OS/VS1 has been adapted for marketing by The European Software Company (Software Ltd, June 5). The system, TSC-3, was developed by Time Software Corp of Anaheim, California, and runs on IBM 370, 135 and up to 400.

TSC-3 is a general functionally equivalent to TSO, offering similar facilities for interactive program development as well as supporting systems programming and operations activities. Its terminal command language and command processors are TSO compatible.

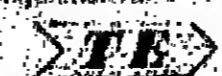
An interesting architectural feature of the software is the elimination of user swapping. In TSO, which is available only under OS, MVS, SVS, and MVS), responses swapping on a multiplex, resulting in a somewhat greater overhead.

Another factor claimed to improve throughput is the use of RRAM rather than TCAM.

The storage requirements of the system developed in the number of active partitions. According to the company, between 10 and 15 users could typically be supported by a one Megabyte partition when running in full virtual mode. TSC-3 will be available in the UK for about £600 per month.



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Cobol for IBM Series 1

A SECOND Cobol compiler has been produced in the US for IBM's Series 1. Claimed to meet full Level 2 ANSI 1974 standards, the software was developed by Royal International Systems, of Tustin, California, and is scheduled for release in October.

Included in the package are a report writer and a sort/merge routine. Written in a proprietary language, the compiler runs in a 28K partition, generating code executable under the RPS operating system.

A HALF-YEAR turnover of £405,000 has been achieved by Systemsolve (Computer Services), representing a growth of 60 per cent over the same period last year. The company recently won a second contract to implement a pension fund system (this time for the 50,000 members of the Port Employers and Registered Dock Workers scheme. The system will be run on an ICL System 10.

MEMO

To TRAINING OFFICERS
Subject CORAL 66 COURSES *

The next Systems Designers
CORAL 66 training course is on

* 7th August 1978 Farnborough, Hants.

Cost: £190.

One week intensive course produces effective
CORAL programmers through the use of
proven, worked examples.

Course organisers are premier suppliers of
CORAL 66 compilers to industry.

Details from Tony Goltboun
Systems Designers Limited
Systems House, 57-61 High Street, Frimley,
Surrey, Telephone, Camberley (0276) 63471.

Just in time

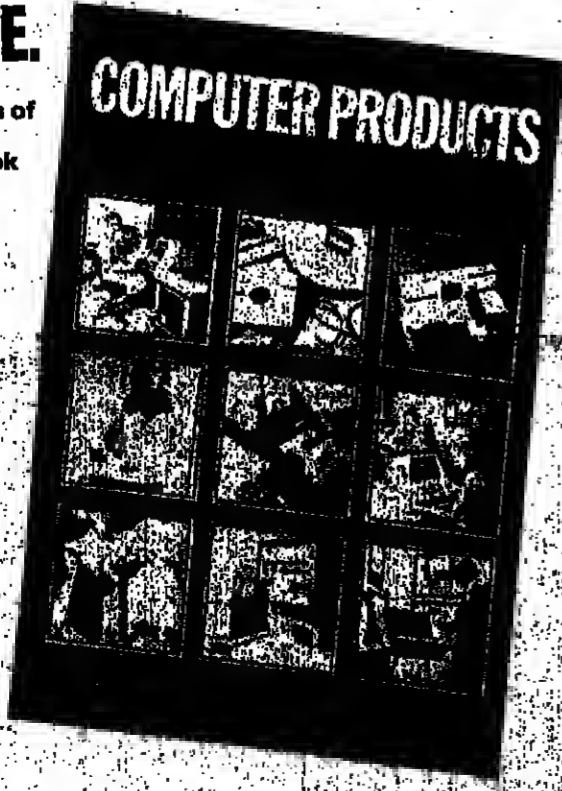
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This big product-news journal, within six months of its launching, is itself big product news! Our latest issue received 3,500 enquiries and look where they're coming from! A precision-planned readership comprising 16,000 key computer executives in the U.K. and 24,000 in Europe... while terms of circulation control have now been extended to include 6,500 electronics design engineers, most of them specifying equipment for OEM manufacturers, the rest DP managers and Systems House executives with direct purchasing power.

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For more facts, ring Display Ad. Manager Steve Measures on 01-261 3000 or direct line 01-261 3293.



Bids in for Midland users consider setting up standby installation

9600bps Datel modems

BIDS are now being evaluated by the Post Office for the manufacture of modems for use on the 9600 bps Datel service which is planned to introduce in 1979.

Contracts for the modems are expected to be placed in about September this year.

Meanwhile a atop-gap 4,800 bps service is operating in the City of London, where 50% of the data transmission handled by the Post Office is centred. Called Datel 4832 it is based on the Rael-Milgo MPS 48 modem and will operate until early next year when the full 4800 bps service based on the Post Office's Modern 11 is scheduled to begin.

This will be enhanced in mid-1979 by a further model of Modern 11 which will support multi-drop lines.

The Post Office's X25 data network is expected to be in service in 1979 or 1980, although it has not yet had formal approval.

THE establishment of a computer centre specifically for providing IBM standby facilities is being considered by the Midland Users Group, Mug, an association of big IBM users in the Birmingham area.

The centre would be funded jointly by Mug members which include BL Cars, Dunlop, Pirelli, Tube Investments, Lucas and GEC.

John Leighfield, systems director of BL Cars, told Computer Weekly that the standby centre is currently being discussed by himself and his counterparts from the other Mug member companies.

He said that the centre would probably be similar to one set up in France by Renault and several other major IBM

users in the Paris area. When not running work for Mug members whose systems had gone down it could be used for program development.

Mug sees itself as a high level pressure group and is taken seriously by IBM, whose UK boss, Eddie Nixon, has already addressed one of the group's meetings.

Gene Amdahl, the boss of IBM's tech

rival, has also spoken at a Mug meeting. BL Cars, which is now concentrating most of its mainframe processing power at its Redditch cars data centre, already has mutual agreements with Lucas and Pirelli to provide standby facilities. Last Christmas BL Cars made use of IBM's bureau centre at Warwick, after one of its 370/158s at Loughbridge went down.

OPERATORS' skills are mainly used, but the fact is rarely recognised — with the result that the staff do not get their just reward in terms of pay and promotion.

The great problem is that senior management seems to be incapable of differentiating between operators who are competent technically, and those who are not.

This is the opinion of a senior operator who contacted me in response to an Op Spot of a few weeks ago, which reported on the DPMA meeting concerning the relationship between operators and DP management.

He told me "I started in operations with a company which provided me with an excellent grounding in computing. They sent me on a series of courses and also arranged for a lot of 'hands-on' training to be carried out at the site."

He stayed with the company for about two years, but left because he worked "an odd shift system" and he wanted something less tiring.

He continued, "I went along to an agency and they told me of a company which was in the process of converting from 'IT' to that on which I was trained, IBM. Subsequently I went along for an interview and got the position of senior operator."

Apparently none of the operations staff had relevant

knowledge of either the hardware or software, and he soon became involved in training them informally as well as carrying out the function for which he was paid — operating.

"I did much to help the staff get acquainted with the system, and that included those who were at a higher grade than I."

After he had been in the site for about a year, one of the operations staff left the company and the position of shift leader became vacant. He applied for the job, but was given little consideration.

"So much for all that training of staff," he said ruefully, adding "I had an interview for the job, with the operations manager and the DP manager, and it was obvious I had no chance."

He blames the DP manager and the operations manager for failing to appreciate his technical competence, and for taking his hard-earned skills for granted.

Of the DP manager, he said: "As far as I can make out, the DP manager is a nice person, but it is obvious that he has no idea of the hardware, software, or the manner in which the computer room is organised."

Talking of the operations manager, he said: "At first I thought he was someone to be trusted but at the last staff appraisal he told me that I was doing really well and would be upgraded in the salary scale in the near future. However, by

chance I saw the report which is sent to the DP manager and it contained such comments as "Lazy, not interested in the work and unmotivated."

As a result of his experiences at the site, he believes that the time has come for the implementation of some means of measuring the knowledge of operators staff.

"Staff appraisals should be carried out on a regular basis and the operator concerned should be shown the report made out by the operations manager and allowed to make a comment on it."

"Also we must have something which will give a true indication of an operator's knowledge and be accepted as such by DP managers. At present the majority of them haven't a clue about what goes on in the computer room."

According to members of Barclays staff, there has been a

steady flow of leavers since the proposed move was announced last October. The figure is said to be about three a month.

The bank has offered a number of benefits to staff who are prepared to make the move to Gloucester. These include a 2½% mortgage for persons of 21 years and over.

Operators often complain that nobody listens to their point of view. Well, Op Spot is listening and Bernard Allen would like to hear your opinions and ideas on all matters relating to computer operations.

Your letters should be sent to Op Spot, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU. Telephone calls are equally welcome and Bernard can be contacted directly on 01-261 8035.



Key information about an organisation's telephone traffic, like unauthorised overseas calls, can be printed out as a call is made on this terminal. It forms part of the Rael Time Generator package introduced by Minster Automation as an enhancement to its Tiger telephone accounting system. Each time a call is made Tiger records the extension number, the number dialed, the time the call started and the time of completion. If not wanted immediately this information is recorded on magnetic tape for analysis later on a minicomputer. Existing Tiger users include Bank Xerox, British Steel, Ronco Vickers, Bechams, Ford Motor Co and Honeywell.

Leyland threat to IBM at Warwick

THE teleprocessing bureau operation set up by IBM at Warwick may soon be facing competition from the centre opened by BL (formerly Leyland) Cars at nearby Redditch (CW, June 22). Chris Chiles, group DP manager of BL Cars, told Computer Weekly that the data processing capacity of the Redditch centre would be expanded by about 30 per cent a year over the next few years and that the intention was to sell bureau services to completely separate outside organisations.

This would be in addition to the processing already being carried out for more than 30 BL Cars sites all over the UK.

Although BL Cars does not actively market bureau services at the moment it already carries out some processing for non-related companies on a limited scale and also provides a number of services for about 300 distributors of BL Cars.

These services already include supplying distributors with bin price data and early next year BL Cars will introduce a batch stock control service. Distributors using this will be equipped with IBM 3741 key-to-diskette data collection stations.

Future developments could include offering services to distributors of the other manufacturers' cars and this would put the Redditch centre in direct competition with bureaux already in this business.

By the end of this year the Redditch centre will have two 370/145s, two 370/158s and a 3033, but Chiles said that the 158s would be replaced next year by a 3033 or by an Amdahl machine. This could be an Amdahl 470 V/7, the biggest machine that Amdahl builds and the most powerful general purpose computer currently available.

Study of word processing in US

A JOINT team from the Civil Service and the Office Machinery Sector Working Party of Neddy is to make a fact-finding trip in the US this month.

A range of installations will be studied in the US government and in private companies, both successful and failures, to glean information in aid of the development of the UK word processing business.

Three representatives from the Sector Working Party will be on the team, with one each from the management services division of the Civil Service Department, the Central Computer Agency, and the Stationery Office.

The team feels there is a lot for it to learn in the US, where the word processing market is more developed than in the UK.

CAM seminar

ANOTHER two-day seminar on the problems of interconnecting logic devices is to be held by CAM Consultants on July 10 and 11. Subjects to be covered at the St Albans venue include cross talk, power supply decoupling and signal termination and drive techniques. Further information on the seminar can be obtained from CAM at 17 King Harry Lane, St Albans, Herts AL3 4AS.

LiveWare File by Don

IF YOU CAN MEET WITH TRIUMPH AND DISASTER... AND TREAT THOSE TWO IMPOSTERS JUST THE SAME...

YOU'RE EITHER A DATAC SUPPORTER... OR A SEASONED DPM!

FLYING HOLLANDER

NEWS IN BRIEF

DEC's family of terminals

INTELLIGENT data capture is the main application area for the PDP-11 family of programmable display terminals introduced by Digital Equipment. The three members of the family, the PDP-11/110, 11/130 and 11/150 all incorporate DEC's LSI-11 microcomputer, which is compatible with DEC's PDP-11 minicomputers.

All three terminals are built around a new video terminal, the VT100, which can display 132-column lines. In addition, the 11/130 has two cartridge input drivers while the 11/150 has floppy disc storage. There is also provision for a local printer.

Online system

TWO Prime 300 computers have been ordered by the Building Research Establishment, a government research body which carries out research into the construction industry. The first will be used by the Establishment's Library and the Building Research Advisory Service for online information retrieval of the Establishment's records, and the other will be used for computer graphics.

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OP SPOT

'Most managers don't have a clue'

OPERATORS' skills are mainly used, but the fact is rarely recognised — with the result that the staff do not get their just reward in terms of pay and promotion.

The great problem is that senior management seems to be incapable of differentiating between operators who are competent technically, and those who are not.

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Apparently none of the operations staff had relevant

Don't try to guess what the programmer meant

"If in doubt, throw it out — that is an old operator's motto and it is still largely true, particularly for testing work. If you don't try to enforce installation standards they will quickly be ignored altogether."

That is the view of Bob Stevenson, who has some 19 years' operations experience, and writes in response to an Op Spot on operations documentation (CW, May 14).

He continues: "Surely all experienced operators know that to try to guess what a programmer really meant is a sure way to waste hours of machine time and overwrite files."

Says Stevenson, "Unfortunately your example is not a good one as it concerns testing work. Documentation for testing is never a great problem because it is not needed in any great depth. All that is required is a well-designed run sheet and some installation rules about testing."

The real documentation problem is with live work, which will be running after the analyst and programmer have gone to join a contract agency. This is when the extra informs

tion on testarls, system flowcharts and sample print layouts, etc is required.

"The main problem is actually getting the documentation before the 'go-live' date. A method that works fairly well is to draw up a detailed dummy set of operating instructions and circulate copies as a standard."

Stevenson makes some interesting comments, but his criticism of the example I gave is unfounded.

On the occasion described, a programmer used the job stream dedicated to testing work to submit a library compression job to the system. The job soon exceeded the time allocated to testing work at that site with the result that the operator, in accordance with the installation standards, cancelled it.

The point I was trying to make was that if the job had been accompanied by documentation which included data as to its function, the operator could have let it run to its conclusion. He could then have contacted the programmer concerned and warned him not to do it again.

HINT OF THE WEEK

Beware when resetting job priority

THIS week's hint relates to the resetting of jobs in the IBM OS/VS environment.

In order to make the best practical use of the system resources, and so aid throughput, the console operator should be constantly aware of the facility which is available to reset job PRIORITY.

However, when rescheduling work in this manner, the operator should ensure that he resets jobs to priorities which are higher than the system default. This is achieved by use of the following OS RESET command:

E Jobname,PRTY = new priority

The reason for this is that if a job's priority is set beneath the system default, all subsequent work will immediately be processed before it, leaving the job concerned on the input queue for an excessive length of time.

The resetting of work via the console is scored at some installations where it is argued that the work has already been scheduled in order to get the best 'mix'. But the practice is often necessary.

Barclays relocation unpopular

THE intentions of Barclays Bank for two of its London computer centres do not seem to coincide with the career plans of a considerable number of its operations staff.

By the middle of next year, the bank's sites at Harrow Road, Harelesden, and in the Tottenham Court Road will have been relocated to a new centre in Gloucester.

According to members of Barclays staff, there has been a

steady flow of leavers since the proposed move was announced last October. The figure is said to be about three a month.

The bank has offered a number of benefits to staff who are prepared to make the move to Gloucester. These include a 2½% mortgage for persons of 21 years and over.

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Nabisco wanted distributed processing not distributed problems - so they ordered the Nixdorf 8820

When you are one of the world's largest food manufacturers and you are planning to expand your vitally important order processing and stock control system, you cannot afford problems.

Take Nabisco — famous for Shredded Wheat. They wanted to further amplify their computing facilities by establishing an integrated communications network, with auto-dial at the master station and automatic answer at the remote sites. Their depot staff were not computer-trained

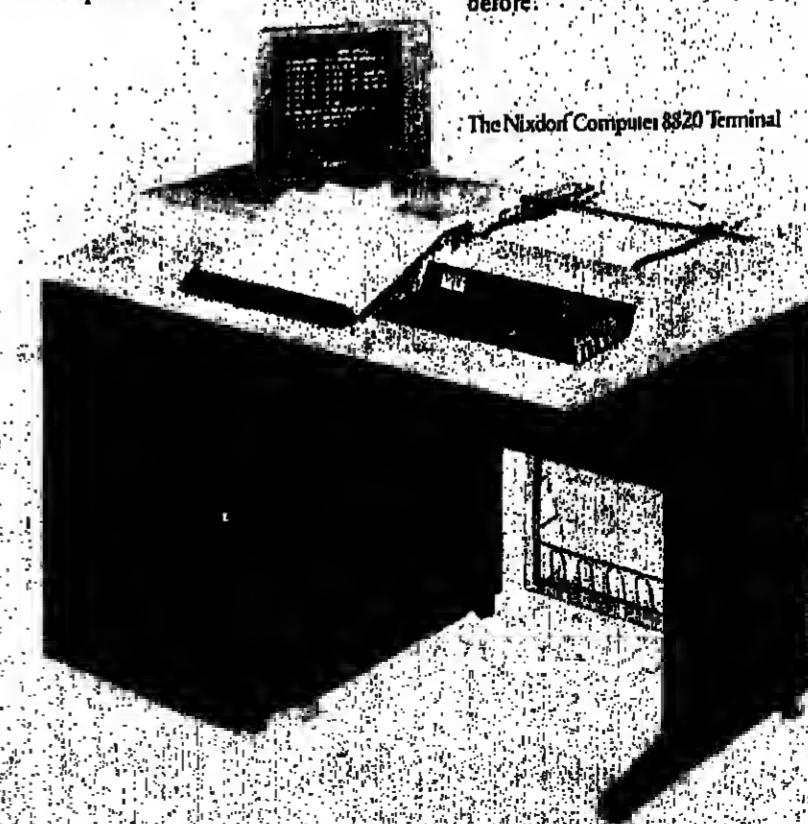
personnel. They knew the sort of problems that arise in such distributed networks.

Problems like: "We had a power failure and all our data was lost." — "Someone has removed a diskette with files left open." — "We have very little office space available." — "We do not want to learn another, non-standard language." — "Can we overlap input/output operations?" — "We may need up to 60K of memory." — "Our people have never used a computer before."

A company like Nabisco does not venture into a project like this with eyes shut. They looked at a number of terminal systems and only one manufacturer had a machine that could provide a satisfactory solution to all those problems and more besides.

Nixdorf is the manufacturer and the machine is the Nixdorf 8820 intelligent terminal.

So Nabisco purchased 10 Nixdorf 8820s and the entire system went live at all depots on April 1st. They are now looking to develop the system still further.



The Nixdorf Computer 8820 Terminal

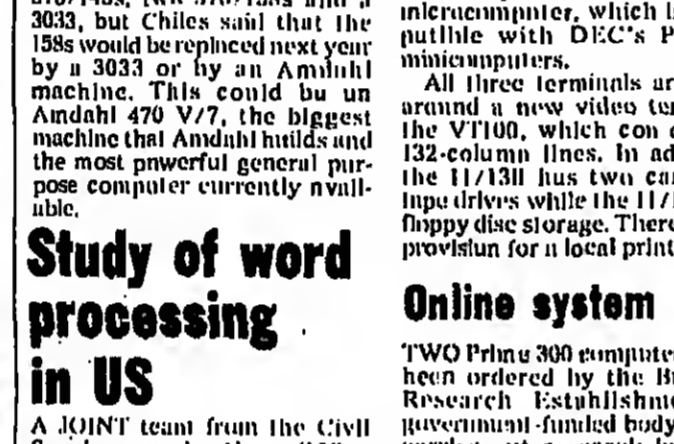
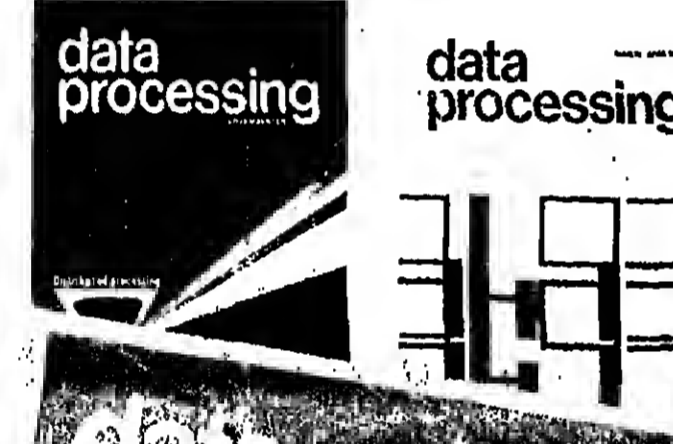
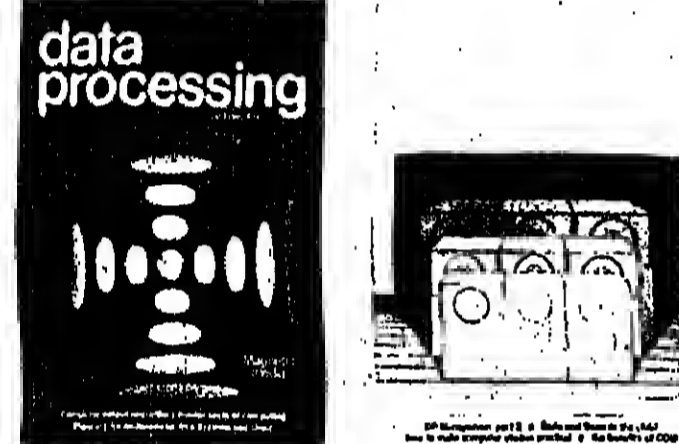


For further details of the Nixdorf 8820 and the Nabisco network, telephone Roger Cordery on 01-572 3111.

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HAVE YOU CONSIDERED THIS ISSUE?

input technology: How much of your data processing budget is taken up by the input process? — Too much? An internationally-known consultant and author of countless computer books and papers has written an exclusive major article for DATA PROCESSING, entitled: "The new generation of input technology." In which he demonstrates how data processing itself can eliminate encoding forms and repetitive verification.

Computer output microfilm: Your organisation could, probably, save over 95 per cent of the office space devoted to filing — simply by using microfilm. You would also save document retrieval and archiving costs. Confronted with Microfilm Europe, we review the latest products.

Do-it-yourself: Availability, versatility and cheapness of the microprocessor are instrumental in a continuing 50-per-cent-plus annual growth rate in the office, and home, do-it-yourself computer field. An expert provides pointers to getting started, and we ask what lies on the horizon.

Just three of the vital features in the June DATA PROCESSING.

Add to this: magnetic discs and tapes with a special section on floppies; two unusual case histories; a special report on the ICL users' convention; pages of products; a roundup of the latest news in convenient form; our regular features on micro-processing and first time users — and you begin to understand why DATA PROCESSING is such an essential reading for dp managers, chief accountants, management services directors, and corporate managers.

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DP 6/78



Three studies in concentration among Computastars competitors.

A high standard from London N of Thames

ONCE again, spectators basked in the bright sunshine as the competitors toiled in the heat, at the London, North of Thames N of Computastars held at the Willesden Stadium last week. A record entry this time, with some 31 men's and 12 ladies' teams taking part in a whole range of events in the hope of qualifying for the final.

The day was concluded with a series of gruelling steeplechase races, and at the end of it all Patrick Kamara, an operator with the Midland Bank, and Gayle May of Case, emerged as the Computastars of the arena. Patrick is a natural athlete, as found out when I finally managed to track him down in the bar after the day's exertions. Apparently not very tired, he told me:

"The steeplechase was the hardest, coming at the end of the day, but I didn't find the other events too tiring. I don't do much sport, although I play football occasionally."

Unfortunately I was unable to find Gayle when the competition finished, but having seen her romp home in the sprints, I feel sure that she didn't even stop at the end of the steeplechase and ran all the way home!

The men's team competition was won by the team from Gordon and Goch with 141 points, with London Transport on 132½ points in second place. The team from EMJ won the men's plate.

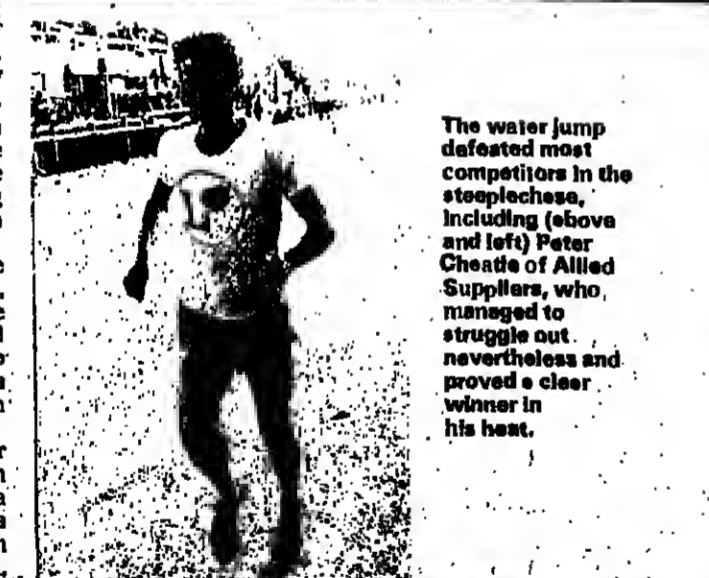
In the ladies' competition, Allied Suppliers were top with 80½ points and the team from Case finished in the runners-up spot with 76½ points.

Some of the athletes who took part in the heat appeared to be of a high standard. A fact confirmed by Gordon Cairns, of John Goldsmith Computer Services, who said, "Some of the teams have been training quite hard for the heats, and the attitude seems to be getting more serious as the competition goes on."

Obviously satisfied with the way the day went, Cairns added, "We have learnt a lot since the first couple of meetings, and today we kept things moving so that the competitors didn't have to wait about too long between events."

In the press-up event, for example, each person goes on until he reaches his limit as opposed to a set time, and in the penalty kicks, we now use both goals."

B.A.



Final heat

COMPUTASTARS is organized by John Goldsmith Computer Services and supported by Computer Weekly.

The last regional heat will be for teams from the Midlands and will be staged at the Alexander Sports Stadium, Perry Park, Birmingham on Sunday, July 9, beginning at noon.

The final of the competition takes place at the Crystal Palace Sports Stadium on September 30.

PEOPLE

Girl Technician of the Year Award

An annual award to the Girl Technician of the Year is to be made jointly by the Carullie Haslett Memorial Trust and the Institution of Electrical and Electronic Technicians Engineers. The award is to be made to a girl who has shown exceptional ability in her work, with no conditions as to how it is to be spent.

The aim of the award is to draw attention to electrical and electronic engineering as a career for women. The winner will be a girl who has not only undergone technical training but has shown that she can hold down a responsible job.

The closing date for nominations is October 1. Further details can be had from Joan Ashton, IETE, 2 Savoy Hill, London WC2R 0BS. Tel: 01-336 3357.

David Radhouse, previously a management consultant with Harrison Computer Services, has been appointed to the board.

Tony Golborn of Systema Designers Ltd has moved into sales, as sales executive, from the advanced software group in which he was a consultant.

Alac Maraden, distribution consultant at British Road Services, has been appointed group consultancy manager, which includes functions such as development and application of computer techniques to transport operations.

Peter Easton and David Morlan have been appointed associate directors of CMG (City of London). Both were previously employed by CMG, Easton as senior systems and programming consultant, and Morlan as project leader of the Payfact team.

Patricia Goodman of VIP Consultants International, previously head of administration, has been appointed chief executive and senior associate with total responsibility for the overall operation of the business.

Paul Methven has rejoined RTZ Computer Services, where until 1977 he was commercial systems manager and technical manager for the Value systems, as systems development manager. In the intervening period he has been DP manager with Norman Miller.

Wallace Avery has been appointed area manager, bank operations in NCR's finance and government division. He was previously a district manager in bank operations.

Chris McCarthy, senior sales executive with Carr Data Processing in Ireland, has been promoted to head of sales, computer sales division.

Raj Prasad has joined Systemative as a consultant in the Northern office, from Gemini where he was a senior programmer. David Sands, previously a project leader with the University of London, becomes a consultant in Sunbury-on-Thames with Systemative, and Michael Bigby joins the company as a senior analyst/programmer from John Courage.

John Morgan has joined J. M. Factors as paper products manager, from Wiggins Teape where he was technical adviser to the IDEM marketing department.

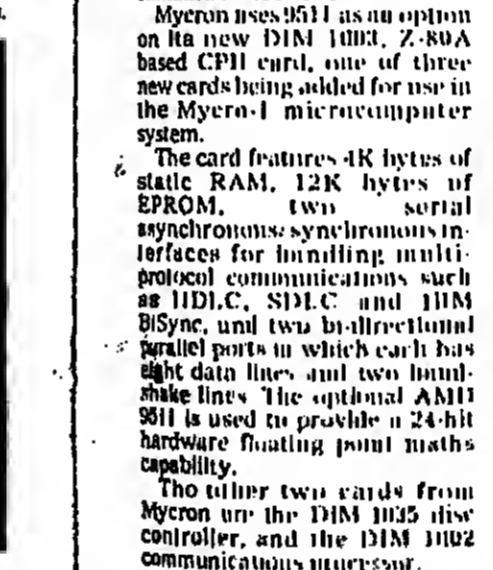
Tony Crossley, previously print area manager with ICL, has joined Software Sciences as marketing manager.

Thomas Howard has joined the data products group of ICL in the US as vice-president, finance. Previously he was assistant corporate controller of Fairchild Camera and Instrument Corp.

Jim Kane, general manager of Computer People Contracts, a VLI company, has been appointed managing director. Mika Slegston has joined the company as sales executive in the Home Counties, from DEC where he was senior commercial accounts representative. Roger Smith, previously a sales executive with Gestecon, has joined Computer People Contracts, as a sales executive in the South-East.

Pat O'Donoghue of Carr Data Processing in Ireland, has been promoted from senior sales executive to head of sales, bureau sales division.

Stuart Ramsden becomes systems support manager for Redfern Computers' Northern branch. Previously he was supervisory field operations in the company's technical information organisation. Dean Webster, previously a systems analyst for central accounts with Redfern, becomes systems support manager for the financial branch of central accounts.



Jackson

Jackson to board

CUSTOMER services manager of Computer Technology Ltd, Jim Jackson has been appointed to the board. It is the first time that a divisional manager has been made a director within CTL.

Jackson joined the support department of CTL in 1971, and became successively hardware support manager, product development manager and UK service manager.

In 1977 the customer services division was formed from hardware and software support training and installation planning, and he was appointed its manager.

MICRO NEWS

Lack of European effort at Geneva exhibition

THERE were few innovations on show at the International Microcomputers, Minicomputers and Microprocessors Exhibition and Conference held at the Palais des Expositions in Geneva last week. Although some new products were being demonstrated, most of the companies taking part were exhibiting in their roles as agents or distributors for UK and US manufacturers.

What was new from European sources, however, was of considerable interest. Two new developments, one from Norwegian-based Mycon, and the other from Data Applications International in Brussels, use the new Advanced Micro Devices 9511 floating point maths chip. This device offers 16 and 32-bit floating point maths with hardware add, subtract, multiply and divide, together with a wide range of complex mathematical functions, and the ability to interface with a standard 8-bit data bus.

Mycon uses 9511 as an option on its new DIM 1013, Z-80A based CPU card, one of three new cards being added for use in the Mycon-1 microcomputer system.

The card features 4K bytes of static RAM, 12K bytes of EPROM, two serial asynchronous synchronous interfaces for handling multi-protocol communications such as HDLC, SDLC and IBM BISync, and two bi-directional parallel ports in which each has eight data lines and two handshaking lines. The optional AMI 9511 is used to provide a 24-bit hardware floating point maths capability.

The other two cards from Mycon on the DIM 1013 are the controller, and the DIM 1012 communications processor.

The disc controller can operate with hard disc systems of up to 50M bytes, and in the company's own systems configuration, it is generally used with either Perse or CDC disc drives. The card has 24 1/2 lines available, and with an 8-bit processor based on two 2901 bit slices offering a 200 nanosecond instruction cycle time, is also capable of being used for front-end processing tasks.

The communications processor can be used either as part of a Micro-1 system or in stand-alone mode. Based on the Z80A, it features 10K bytes of dynamic RAM, 2K bytes of EPROM and two serial asynchronous/synchronous interfaces for handling HDLC, SDLC and IBM BISync communications protocols. Baud rates are from 50 to 38,400 baud.

Data Applications International has introduced the AMD 9511 in a range of low-cost controller cards called RCS — the "Real-World" Control System, and five versions have been produced to meet a variety of applications.

They are all based to some degree on the first version, the RCS-K kernel module. This uses an Intel 8085A microprocessor together with the AMD 9511 for scientific floating point maths functions. The kernel features between 4K and 8K bytes of PROM space, between 1 and 4K bytes of RAM space, five external vectored interrupts, optoisolated serial I/O interface with programmable baud rates, and an on-board power supply to run from 24 volts.

The other four versions that make up the family of cards are the RCS-GCM general control module, the RCS-ACM automation control module, the RCS-PIC position and temperature controller and the RCS-ICM instrument control module.

Following the "real world" theme, the company is also shortly to launch a new "Real World" Basic interpreter. Intended for the same process and industrial control applications for which many simple Basic interpreters have been written, the DAI version is said to include input/output and interrupt functions, which the company claims are not available on other simple Basics.

The problems of developing microcomputer systems using a variety of different microprocessors was demonstrated at the exhibition by a US company, Boston Systems Office Inc, currently looking for a UK agent. BSI provided information on a recently introduced multi-user, multi-microprocessor software development system that is capable of operating with some 30 different micros.

It is in fact a software package that can run on any DEC System 10 or System 20, PDP-11 or Data General computer system. According to BSO president, Michael Kuncy, up to 50 users can work with the system simultaneously.

In addition to the complete software development package, the company is also offering some of its constituent parts, such as cross assemblers, linkage editors and simulator debuggers, as separate items. As well as selling the packages, BSO has them available on international time sharing services.

For companies that have existing microcomputer development systems, BSO can also provide the necessary interfaces to enable the user to directly down and up line load to and from the system.

\$3.5bn 'personal' growth

A PERSONAL computer market worth \$3.5 billion by 1982 is one prediction to emerge from the North American market.

According to an analysis of the personal computer industry produced by a California-based market research firm, Creative Strategies International, shipments of personal computers are set to jump over 540% this year, rising from 43,000 units in 1977 to an estimated 275,000 by year end. It predicts that by 1982, the rate of annual unit shipments

will have risen to 1.2 million computers.

To make up this massive growth, the analysis predicts that the major markets will be found in the home programmer and the very small business sectors. Further equipment developments will be needed to help make this growth possible, and several industry observers have stated that the computer must be re-examined to make way for an "information utility."

Edited by Martin Banks

DIY show reflects growing interest in 'personal' market

THE growing interest in personal and small business computer systems continued last week at London's West Centre Hotel, where the DIY Computer Show was held. Although originally intended as a showcase purely for the DIY enthusiast, the exhibition had been spread to cover the small business systems area.

The DIYer was not without some things to see, however. On the Bywood stand for example, the company was not only showing its existing Scrumpl 3 microcomputer, but was also talking about the next development, the first prototypes of which are expected to be ready in about two months.

Known as Scrumpl 4, it will be a single board microcomputer kit with an expected retail price of under £150. It is one of the first announced applications for National Semiconductor's 32K bit ROM holding the 4K byte National Industrial Basic Language, and the board will also feature a socket for National's 64K bit ROM. Memory capacity will be 8K PROM and up to 8K bytes of RAM.

As well as being used for hobby-computing and as the basis of a home computer, Bywood also expects a market in low volume OEM areas. As with other Scrumpl kits, Number 4 will be based on the National SCMP processor. For those with cash in hand, a stand worth a visit was that of Jade Computer Products, of Lawdale, California. On hearing about the show, the company arranged to fly over from the US with a range of hardware and books to sell off at the stand. These included a Shugart 801A floppy disc drive for £305.50.

Getting a first public showing at the DIY exhibition was the recently introduced single card computer from Cromemco. Displayed on the stand of Comart, Cromemco's UK agent, this Z80 based system is specifically intended for the OEM process and industrial control markets.

To increase its penetration into this market, Comart is planning to enter the manufacturing field with a backplane board and chassis system for small OEM quantity applications. First samples of the S100 bus back-plane are already available, and the complete package should be ready for sale in about two months.

On the software front, the company now has available a modified version of the Cromemco 16K Basic that accommodates use of the North Star floating point maths card.



Small computer systems are now gaining the interest of some of the world's largest companies, and the Consumer Products Division of IIT has taken on board the Apple II machine to sell as its own IIT Computer. Seen here in a business environment, the system had its first public demonstration at IMMEX in Geneva last week.

Iran sets up company

WHILE the National Enterprise Board's plan for a UK semiconductor company is in its infancy, the Iranian government has established its own company, Electronic Component Industries, with an initial investment of \$15.5 million.

Initially ECI will confine itself to encapsulation, and has spent \$1.4 million on testators from Tarydine, and \$800,000 on encapsulation equipment from Kras Corp. Encapsulation is due to begin in August.

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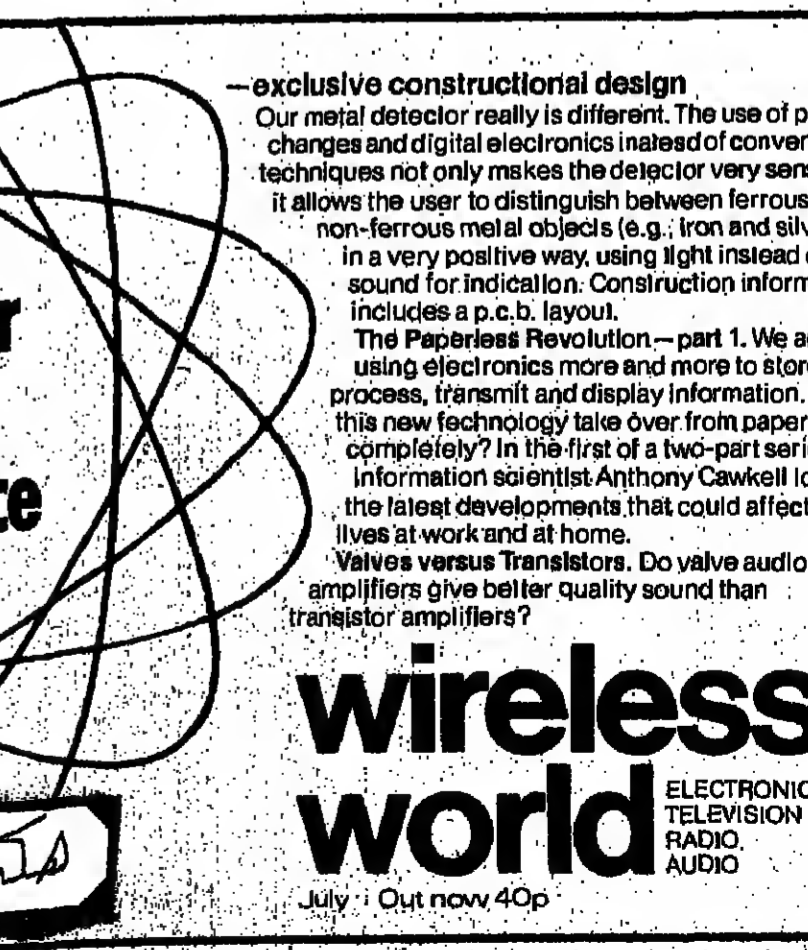
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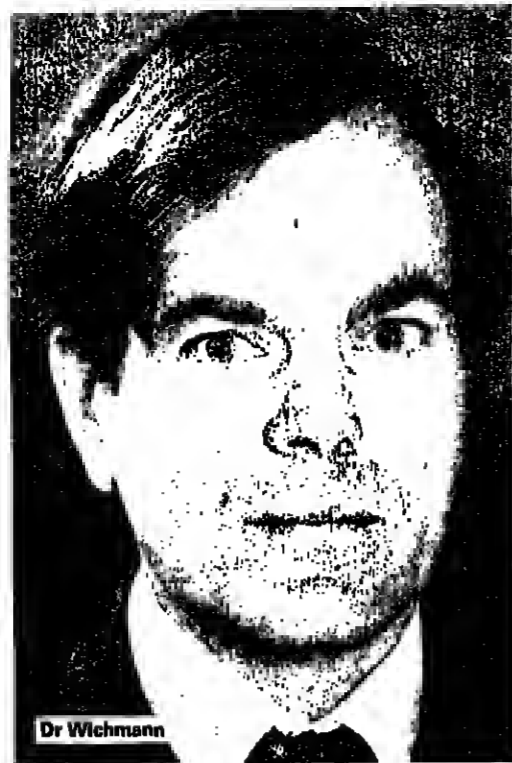
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- JULY 6-7: Programming group meeting, IBM Computer Users' Association, Holiday Inn, Liverpool.
- JULY 12-13: Current problems and methods in partial differential equations (Fourth Summer School), Liverpool and Manchester Universities, Department of Mathematics, University of Manchester.
- JULY 12: "Training: CMC Users' Association, (CUMAC), Norfolk County Council, Norwich, 10.30. Details: Malcolm 0693.
- JULY 12-26: Artificial intelligence conference, Aston University, Birmingham. Details: Derek Slemmon, Leeds 17781, ext 7284.
- JULY 12-26: Local authority group meeting, IBM Computer Users' Association, INLOGOV, Birmingham University.
- JULY 20: Southern Group meeting, ICL Data Entry Users Group, ICL Ltd, Basingstoke, 11.30.
- AUGUST 4-8: Computers, communications and technology transfer, Jerusalem conference on Information Technology, Information Processing Association of Israel/IEEE, Jerusalem.
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- AUGUST 22-24: Conference on parallel processing, IEEE Computer Society/Wyoming State University, Bozeman, Michigan, USA.
- AUGUST 24-25: Planning 75, fifth conference on computer graphics and interactive technology, Association for Computing Machinery, Atlanta, Georgia, USA.
- AUGUST 26-SEPTEMBER 1: Eighth Australian Computer Conference, Australian Computer Society, Canberra.

A mini problem for the US Ironman project

By Dr Brian Wichmann



The Pentagon's project to create a state-of-the-art language has attracted much attention. The last similar programme was the US Navy's development of a standard language for data processing. This resulted in Cobol and the fruit of the current work is likely to be at least as widely used.

In this article, Dr Brian Wichmann of the National Physical Laboratory reviews the progress made to date and examines some of the features of the language requirements and proposals. Dr Wichmann has been closely involved in European work on the development.

AS MANY readers of Computer Weekly will know, the US Department of Defence (DoD) has embarked on an ambitious programme to design a new language for "embedded computer systems" — ie in UK terminology, real-time systems.

A major objective of this project is to reap the benefits of standardisation. Whereas the Ministry of Defence uses only one high-level language, namely Coral 86, the US is currently using over 350 languages on about 250 different machines.

The US has shown great interest in Coral 86 and the success in establishing it as a standard. However, it has decided to aim at a much higher level language, appropriate to the needs of the 1980s and beyond.

The project started about seven years ago when an initial specification for the language was produced under the title Ironman. This was later successively refined in a series of documents called Woodenman, Tinman, Ironman, and Ironman (revised, July 1977).

The Ironman requirements were used to assess existing languages to see if any were appropriate as a basis for development. It was felt that PL7, Algol 68, and Pascal could be used as base languages, and tenders were requested for language proposals to meet the Ironman (revised) specification. In August last year four contractors were chosen, all using Pascal as a base language. In

February of this year the DoD published these proposals without identifying the contractor responsible. Each language was given a colour code so that comments could be elicited on the language designs without revealing the design team responsible.

It has now been decided that Red (Intermetrics) and Green (CII-Honeywell Bull) will continue working while Yellow (Stanford Research Institute) and Blue (Softech) will not. In the next stage the two contractors selected will refine their designs to meet Steelman and implement a pilot compiler.

It is DoD's intention to make a machine independent compiler freely available and hence, after writing a few code generators, implementations of the final language should be available on a wide range of machines. However, the complexity of the language is such that compilers are unlikely to be very fast or small.

Hence, there may be problems in running the compiler in a typical minicomputer environment. On the other hand, the language designs do not assume the support of a large operating system and hence compiled programs could easily be run on minicomputers as well as the better microprocessors.

In what environments is the language likely to be most popular? Clearly, the relative benefits will depend upon current usage. Moving from Coral 86 would be a significant step forward whereas those already using RTL/2 may not find the

move worthwhile. Many real-time projects are still undertaken in assembly languages, particularly systems programming, and in this area the new language could have a significant impact.

The DoD has explicitly excluded from its study applications which are currently handled by Fortran and Cobol. Nevertheless I would also expect many scientific programmers to prefer the new language because of its better control structures,

IT is the Pentagon's intention to make a machine-independent compiler... however, the complexity of the language is such that compilers are unlikely to be very fast or small. Hence there may be problems in running the compiler in a typical minicomputer environment

data structures, and precision control.

What are the main advantages the new language would give? Many of the features are already available in Pascal and can be briefly summarised as follows:

- Good control structures (if-then-else, for, repeat, while, until).
- Good procedure structure, with nested scopes for variables.
- Powerful data structures without any run-time penalty. Arrays (of static size) and records can be freely used without garbage collection or a complex run-time system.
- Simple variables can have range limits imposed — permitting extensive compile-time checking. Typically an integer (I) is declared as being in the sub-range 1..N and hence A[I] is valid if the same sub-range is used to declare the array.
- Variables can be declared to be of a type which has only a restricted set of named values. For instance a variable of type DAY would have one of the values MONDAY, TUESDAY, WEDNESDAY, etc.

However, many further facilities are demanded by the Ironman requirements resulting in a language which is much more powerful than Pascal without reducing the capacity for compile-time checking. These additional features are as follows:

- 1 Data storage whose size is data dependent (like Algol 68 arrays).
- 2 Fixed-point data types
- 3 Control over the precision of floating-point data types.
- 4 General expressions to be evaluated at compile-time.
- 5 A method of handling exceptional conditions (which could be detected by hardware or software). This enables a programmer to conclude an activity cleanly in spite of unexpected errors.
- 6 Encapsulated definitions to reduce the visibility of names and increase the modularity of large programs.
- 7 Facilities to run parallel processes with low-level synchronisation primitives.
- 8 A method of specifying the physical layout of data items, low-level input-output, and a means of writing or incorporating machine code.

Facilities 1, 5 and 7 may have a small run-time penalty, but the power provided to the programmer makes this worthwhile. All the other extra place a significant burden on the compiler but allow the programmer to code quite complex tasks with ease.

A major emphasis has been placed on the ability to perform as much compile-time checking as possible. With many complex weapons systems, live testing is either very expensive or not possible at all. Hence, simulated execution (with checking) of formal verification methods is to be preferred. Good design — which is evident in the successful languages — allows a large amount of checking without placing an undue additional burden on the programmer.

For example, the programmer can insert a statement in his program — assert (boolean expression) — meaning that the stated condition should be true. If the compiler can show that the condition is false, then the program will fail to compile, but if the condition cannot be verified by the compiler, appropriate code can be generated to check the condition at run-time.

Both Red and Green have "strong" typing as in Pascal — that is the user can define new types and no implicit conversions are available between types. Hence, the typing mechanism acts as a barrier between variables so that the user can be more confident the program does as he intended.

An Ironman requirement is that the strong typing mechanism should be preserved with separately compiled routines. Hence, the parameters of sub-routines will be checked in the same way as every other construct.

In spite of the progress made in two provisional language designs, many problems are not yet fully resolved. For instance, "aliasing" should not be permitted. By this, one means that two entities given a distinct name in a program must be distinct. Clearly if two pointers X and Y both point to Z, then aliasing occurs between X and Y. Ironman did not require that this should be avoided, provided that Z was of a type that was always accessed via a pointer.

Even with this relaxation, aliasing is very difficult to prevent in a language of the complexity proposed. For instance, if X is global and Y is a parameter by reference of the procedure P, then P(X) will cause X and Y to be aliased if the global X is accessible in P. The Red language avoided this by insisting that the procedure P imports X so that the call of P can be rejected.

All this may seem rather pedantic, but it is necessary if verification methods are to be used with large software systems. For instance, given a matrix multiplication routine, MUL(A,B,C) with C being the result; the routine will usually fail if C=A or C=B, but how many systems check for this?

Another interesting area which will certainly require further consideration is the language design is the handling of parallelism. The Green language is the only one to have a method of handling tasks which could be easily extended to a multi-processor system (with or without shared store). In the Green design, each task has parameters called "boxes" which are data items whose contents are transferred on the basic primitives send and receive. The two tasks which communicate via a box are synchronised at the send and receive. There is no buffering implied by the mechanism since both tasks necessarily have space for the data transferred.

Now that individual microprocessors can be purchased very cheaply, the ability to exploit such systems within one language could be very important. The Red language contains a "monitor" system which allows mutually exclusive access to shared data from parallel tasks. This is an important requirement when several tasks run on one computer (and hence share store). This requirement can be programmed using boxes in the Green language but the code would be more cumbersome than with the Red language.

The next phase of the project will last until April, 1979. The contractors will produce a more rigorous language definition and no doubt revise the language in the light of comments received. A pilot compiler will also be produced for each language so that coding experiments can be undertaken to validate the language proposals. A final choice on the language should be made in 1979, but even then it will be some time before production compilers are available for general use.

Figure 1. A rational number package using the Green language.

Figure 2. Handling arithmetic exceptions in the Red language.

SMALL BUSINESS SYSTEMS

Although small business systems were first aimed, naturally enough, at small companies and first time users, they are now also accepted as key elements in the development of distributed processing networks in large organisations. The continual reduction in the cost of minis and micros has meant that small systems have been able to take over much of the traditional VRC market and, at the

other end of the scale they are moving into the province of the lower ranges of mainframe. In this first article Keith Ruddle, of Arthur Andersen and Co, looks at the confusing choice now open to users, and on following pages David Shirley, of Computer Information Centra, outlines software requirements, and Harold Laa, of the NCC, offers some guidance to newcomers to computing.

Confusing choice in a growing market

By Keith Ruddle

THE smaller company, or independent unit of a large business, is facing an increasing number of choices at the lower end of the business computer market. Manufacturers of hardware, with minicomputers and microprocessors becoming cheaper by the minute, are now competing favourably in the areas where accounting machines and visible record computers were previously dominant.

Similarly, the overlap in applications between these newer machines and the traditional small mainframe products is becoming considerable. The result of these advances appears to be more confusion for the first time user. Furthermore, a new and large market of small businesses is being introduced to all the problems of doubling in the industry: systems planning, design, implementation, operation, and support.

As an overview, one should first establish what "small business systems" really means, then look at some of the significant trends in the market, and finally highlight the problems to be addressed by the small computer user. In common with the rest of the computer industry, terminology is applied loosely at the lower end of the market. A "small business system" generally refers to a small computer, probably operating in an ordinary office environment and performing commercial business applications. The hardware can range from visible record computers, through cassette systems, floppy disc systems, to disc based minicomputers and small mainframe machines.

Although this definition covers the whole range, the real changes and growth have been seen in minicomputers. Even here, the definition is blurred, and sometimes "minicomputer" is used simply to describe the phenomenon that has occurred at this end of the market. It is safe to say, however, that machines with desk-top terminals, and built-in data storage on disc have become the mainstream products, rather than expensive, new technology alternatives.

The traditional commercial applications are still prominent, such as order processing, accounting ledgers and statistics, book-keeping, payroll and then, to some extent, more sophisticated manufacturing planning and control. However, we now have to include the growing field of word processing as part of the renewed attack on office efficiency and productivity. The final and very significant use of small business systems as part of a larger network, often connected to a large central mainframe, in this

case, the local processing remains as a small business application, with an intelligent computer at the local site. It is, however, linked to a mainframe either to provide co-ordination of business information through a central group function, or to have access to more powerful processing.

Technological advances in integrated circuitry have had an impact in several industries, from the calculator market through to microprocessors for controlling cars and domestic appliances. In the business computer market, the effect has been equally drastic, and will continue to push down the hardware cost per unit, and increase the processing capability. The stage of "a computer on a chip" has not yet been reached commercially, but is rapidly approaching.

These trends in hardware, by reducing the cost for the same, or better level of performance, are making decentralised and distributed processing economically sensible, and cost-effective computer processing within reach of the smaller office. Simple disc based minicomputers with limited peripherals can now be purchased for under £10,000. Indeed, for this type of system, the peripherals — printer, store, screen and data entry terminal — constitute the major part of the investment. Processing hardware is becoming simpler with less need for manufacturers to design sophisticated control logic.

Two simple minis can be better and cheaper than one complex machine. The trend in processing cost can give each local manager a machine of his own, and he need not necessarily worry if it is not used to its full capacity. As product maturity comes to the minicomputer market, competition is getting tougher, with literally dozens of manufacturers producing cheap, reliable and flexible hardware. With such a level of competition, however, many of them will not be around in five years time.

The rapid fall in hardware costs is emphasising the high cost of software. Software development remains very labour intensive, and labour costs are increasing. It is only recently that improvements to minicomputer systems software tools have been made. Traditionally, minicomputers have supported simple operating systems and low level programming languages. Now, however, we are seeing the development of database management systems, real time systems development aids, and high level languages to assist the user.

Application software, to perform the business functions required, remains an area of significant cost and difficulty.

To provide a cost effective business application, packages suitably modified for particular customer needs have become an industry in their own right. Compared with simple accounting machines, however, small business systems can support complex, integrated applications which bring with them major problems in design and implementation.

With one or two notable exceptions, the equipment manufacturers have not been concerned to providing the complete "systems service" that we are used to on the larger machines, including application software products and support. This has resulted in software or systems "houses" adopting an approach of providing the whole package of hardware and software. The original manufacturers are often content with selling at a discount to this intermediary, and the latter deals directly with the final customer for all aspects of the system. This leads to a proliferation of apparently different machines based on the same central unit.

The number of potential users of small business systems is growing, and more companies than ever are becoming exposed to the pitfalls well known to personnel experienced in the industry.

Although expert advice is

available, prospective new customers still approach the decision to buy a computer with little forethought and planning. This results in not only a wasted investment but considerable disruption to a business that may well have been running smoothly. Smaller companies typically have no expertise in data processing and the same mistakes are repeated across many first time users. It is possible, however, for management to take the correct preliminary steps before making an investment decision.

First, in systems planning, which is really an extension of normal business planning, management can identify the major business priorities, and the overall systems objectives. The company must decide what overall systems improvements are being sought. Once some agreement and commitment is reached, then management should spend some time in educating itself as to how "small business systems" might achieve these improvements. The prospective new user often has little or no concept of what a computer is, or how it can provide "systems solutions".

Once this point is reached, then the second phase of developing a written systems specification can take place. For the unsophisticated company,



Keith Ruddle is a manager in the Management Consultancy Division of Arthur Andersen and Co. He works primarily with small and medium-sized manufacturing companies.

with no external assistance, this may not result in a highly technical product. There are, however, basic guidelines that can be followed, and the vital goal is to establish some form of statement of requirements before approaching the supplier of the hardware or software.

Selection of prospective vendors requires some basic criteria to be established. A questionnaire and checklist can be developed against which proposals

can be evaluated. This must cover all aspects of the supply, installation and maintenance of hardware and software, together with specific questions on installation experience.

Finally, before a decision to proceed is made, the benefits and costs must be established, together with a schedule of implementation steps, effort, and timescale.

A small business system is not easy to install and run, and should not be regarded as simply a grandiose accounting machine. The trend is, however, towards "turnkey" installation and simple operation. In these cases, the supplier or perhaps a contracted software house, provides all the program development effort and installs the machine. Training for operators is also provided.

Even in this approach however, the local management must perform particular duties to ensure a successful installation: close monitoring of package design and modification to the specified requirements; full project control over timescale and cost; detailed participation on a comprehensive systems test; planning and organisation of the changeover or conversion activities; responsibility for providing full user participation; and finally, ensuring that support is continued after conversion.

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How to choose your first computer

THE acquisition of a computer system should be treated by the first time user with the same amount of care as used in the selection of a wife. A mistake at any stage in the process can lead to a great deal of acrimony and disenchantment.

It remains a constant source of amazement to many members of the computer profession that extremely intelligent people, at a high level of management, treat buying computer hardware with less thought than the purchase of a washing machine.

For example, some senior executives of firms who are themselves in the business of selling, assume that in some way the marketing of computer equipment carries with it a pinnacle of honesty and integrity. This is not intended, I hasten to add, to imply that the selling of computer systems is in

any way dishonest. But it is rare in any form of selling to illustrate, much less emphasise, the possible drawbacks.

One firm, which is involved in the construction of houses, quite happily believed that, when the system had gone live, the software supplier would drop everything and instantly correct any software problems. It can only be assumed that repairs to their own houses were carried out in such a state of willingness.

From such stories that circulate concerning disastrous failure of computer systems, the reader may be left with the impression that the world of computerisation is beset by pitfalls left to trap the unwary. This may not be absolutely true but, with that thought at the back of your mind, a reasonable start has been made.

The purchase of a computer system contains many similarities to the acquisition of any piece of reasonably expensive machinery. The major differences lie not in the machinery itself but in the fact that a computer system will require programming. The computer programs will have to be written by people. More importantly, these programs will probably, even if it is only indirectly, be specified by you, the first time user with little or no computer expertise. If the requirements can't be defined by yourself, it is expecting a great deal for a computer specialist to provide good satisfactory solutions.

So, how do you go about acquiring the perfect computer solution to your current business problems? First you must be clear about the reasons for installing a computer. If the

existing manner of working contains little or no clerical discipline and problems are inherent, due to the type of staff or other valid reasons, these problems must be solved before computerisation is attempted. Computers will not solve the problems of organisations which cannot maintain a good manual system. In fact, the installation of a computer will only aggravate these problems.

Assuming that you have a reasonably efficient existing method of working, why should you computerise? Even if you know the limitations of the current system and can define the requirements of your computer system, what will it cost and is it practicable?

It is difficult for a first time user to have the necessary expertise to answer these questions and, therefore, it is recommended that good, professional and independent advice is sought. This may appear initially to be expensive but then, mistakes at this stage can be extremely costly in the long term. After all, one is unlikely to satisfactorily cure toothache without resort to a competent dentist.

Thus, a feasibility study should be carried out. This will consider the likely requirements, benefits and costs of a computer system. The justification will then be a comparison of the costs against the benefits. Since the benefits may be tangible, reasonable to cost justify, or intangible, difficult to cost justify, it is up to the user to make the final decision as to justification.

If the outcome of the feasibility study has indicated that you should progress further, the next stage will involve a more detailed definition of requirements. This will involve the identification of each application area such as sales ledger, purchase ledger, the volumes and type of input and output with timescales, the definition of computer record contents, etc. It is also important at this stage that a reasonable estimate of any future enhancements is made. All this information should be put in the form of a tender document against which suppliers may submit proposals.

The preparation of this document gives a two-fold advantage. Firstly, the definition of computer system requirements enforces a high degree of brain searching and discipline within the user's organisation. Secondly, because every proposer has been given the same information, a comparison of like against like can be made. As in the feasibility stage, professional advice is extremely useful, and probably very necessary, at this stage.

It is appreciated that the actual definition of requirements may be difficult, given a lack of knowledge as to the capabilities of computers but, even without advice, a serious attempt must be made. It is useless to define requirements with such phrases as "make the department more efficient". The "hows" and "whys" behind such statements must be clearly understood, together with the necessary justification for each section of the requirements, even if this is not put in the specification. Computers, at all levels, have the in-built facility to reduce forests to woodchips and make millionaires out of paper suppliers.

After receipt of proposals, the selection process will begin. At this stage, if not before, the user will realise that the amount of jargon used and unnecessary literature that most suppliers produce, makes selection as easy as driving across Piccadilly Circus blindfolded.

Re-entrant code, virtual storage, swap ratio, unibus, megabus, etc. — not only are the words confusing but it is difficult for anyone to compare the performance of two or more

By
Harold
Lea

How does the first time user go about the jungle of computer selection? Harold Lea (left) of the National Computing Centre, says it is an acquisition that should be treated with the same care as used in the selection of a wife — a mistake at any stage in the process could lead to a great deal of acrimony and disenchantment.

machines that operate under different criteria under what are, necessarily, projected circumstances. Even something as simple as file storage capacity — 1,000 records each 20 bytes long makes 20,000 bytes of storage. Or does it? Any computer professional will say that this is not true, but it is this type of arithmetic that appears all too often in proposals.

So how does the first time user go about the jungle of selection? Seek expert advice. Even if the experts cannot be absolutely certain, they should at least be able to offer a high degree of safety in the sense that any machinery recommended will be at least as powerful as is required.

One reasonable method of selection involves the identification of factors which are important to the user. These factors are then graded by importance and each proposal marked. A multiplication of the scores and grades then gives a mathematical indication of the most satisfactory solution. There is obviously more to the final selection than the mathematical score but at least the reasons behind the score can then be identified and discussed.

Proposers should be asked to submit lists of existing clients. Ring as many as is practical, particularly in your area. Support can be very much area dependent.

The type of applications software that can be used falls into two broad categories. These are software packages, existing computer programs that will, for example, process a sales ledger, and a tailor-made system, consisting of new programs designed and written specifically for a particular client. Cost is generally a major factor in deciding which approach is to be made, although it is often a combination of existing packages and tailor-made packages which provides the most satisfactory solution and, therefore, cost may be secondary. Existing software packages are generally cheaper and have secondary benefits of being in theory at any rate, tried and tested.

Common omissions when estimating costs include monthly maintenance costs, paper, desks, partitioning, operating system software, training, power supply, air conditioning and file conversion. Your £20,000 purchase is suddenly costing £50,000 to run over five years.

Successful installation of any computer system is ultimately dependent upon the complete involvement of all concerned, both user and supplier. The implementation has to be controlled in the same manner as any project, be it the erecting of a building or the installation of manufacturing machinery. Failure to control a computer system installation will create problems in excess of those inherent in any significant change in the manner of working.

Finally, when all about you appears to be falling into one gigantic heap, remember that computers are installed successfully and do produce extensive benefits.



Prices cut too low for health of the industry

By David Shirley

DURING the past five years, hardware advances in the design of small business systems have been more dramatic and more publicised than in any other area of computing technology. The price of complete small business systems in particular has fallen to the point where several suppliers offer a complete system — VDU, two diskette drives, processor, and printer — for less than £10,000. Ten years ago a system of comparable power would have cost £50,000; even five years ago it would have cost £30,000, so the improvement in price-performance ratio has been around 300%.

Unfortunately, although the price of the equipment has changed, its design principles and the systems and programming effort required to install it have not. The budget for software on interactive disc systems five years ago was in the region of £7,000 for one main application, ie about 20% of the hardware price. The same amount of software effort is still required today, and linking that budget to the rise in cost of living, one would expect software to cost at least £10,000 per main application. But this would represent 100% of the hardware price, and the potential buyer of a small business system will not consider such a software cost.

The computer industry is, therefore, faced with a dilemma. It is charging less than half this figure. The difference is often made up by severe loss of profits by the supplier, and sometimes by impossible schedules, short cutting on program testing and lack of operator training.

How can we legitimately close the gap between what a user should pay and what he is prepared to pay? One possible pincer is the program package, written once but installed at many users. In theory, this approach should be viable at 10% of potential users, but reality is sadly different. Take an application such as sales ledger pricing.

One user will insist that discount be posted separately from cash and that it should be shown in a separate column in the statement. The next user will object strongly to any reference to discount on his sales ledger. The result is not one package but completely different sets of programs for ledger posting and statement printing.

An even more fundamental difference between customer demands is that while most sales ledgers work on the "brought forward" principle with cash applied against the total balance outstanding and the balance for a particular period, a large minority of customers insist upon open item accounting which requires cash to be offset against individual invoices.

Even this variation plus discount variation means that a supplier has to produce four sales ledger packages rather than one, but in practice there are other variations in posting techniques and output formats which bring the total number of possible sales ledgers to about 20.

It is standard packages are limited, what of the possibilities of a package generator where one fills in a few parameter sheets, punches them into a large mainframe computer, and out comes a specially compiled and tailored "package"? This approach can certainly work. VCR did it many years ago with BEST for the 315, and Burroughs recently with LINK for the 15000 visible record computer.

However, it takes a very long time and a vast budget to create a package generator, and hardware developments are now occurring so quickly that by the time a package generator was complete it would no longer fit the equipment.

You need: file creation and maintenance, file enquiry, stock receipts posting, stock issues posting, stock allocation, purchase order posting, file list, complete or selective and list of items which have fallen below reorder level.

It is totally impossible to specify, write, and test any one of these programs in less than a week. The minimum charging rate for programmer time needed to give a software organisation any hope of making a profit is £300 per man week. Thus the stock control application alone should cost £2,400 plus at least £300 to install it at the customer site and to train the operator. Multiply this figure by an average of four applications installed on each small business system, and the computer industry should be charging around £11,000 for software per installation.

In fact, it is charging less than half this figure. The difference is often made up by severe loss of profits by the supplier, and sometimes by impossible schedules, short cutting on program testing and lack of operator training.

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The development of CIC's

Executive 15 is a typical example. When it was launched in January 1977, it offered a "glass teletype" VDU with upper case only, a standard memory size of 24K, 2 or 4 diskette drives, and a 30 cps matrix printer. In April, 1977, the standard memory size had been increased to 40K and the print speed to 100 lines per minute. In October 1977, the VDU was changed to a model with upper and lower case and direct cursor addressing. In April 1978, a new terminal was added combining a daisy-wheel printer and an even more sophisticated VDU in one unit, including its own buffer of 7680 characters. In July 1978, a 10 million byte cartridge disc

will be available on it. Since the production of a package generator requires an elapsed time of at least one year, how can it possibly be produced against such a rapidly changing hardware background?

The truth is that the computer industry is cutting its prices too low for its own health or that of its customers. This alarming-like rush to the brink of commercial suicide is being accelerated by the arrival of the hobby computer which is fostering the illusion that a complete working computer system should cost less than a secondhand car.

In fact, the price of hardware which will work reliably for years in the environment of a

small user who is changing functions, programs, and stationery three or four times a day has probably reached its lowest viable level, particularly when one bears in mind the high cost of selling to the small business user.

Anyone who believes that a programmer is someone who translates simple business arithmetic into computer codes should read the Inland Revenue's latest publication Specification for PAYE Tax Routines — April 1978 Edition.

Today's systems programmer, therefore, requires almost as much financial knowledge as a chartered accountant and has to know his equipment, its

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operating system, and programming language. Such knowledge is not easily, yet it must be thoroughly and carefully if the installation is to operate successfully. The reputation of the computer industry cannot be maintained and at the same time, as a profession, it is certainly a small business. The cost of a small business installation may be short, irreducible minimum but the cost of software and rather than by any factor.

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IPC Electrical-Electronic Press Ltd., the world's largest publishers of computer, electrical and electronic journals, have made special arrangements for readers wishing to visit important overseas trade fairs. The cost, in most cases, is little more than the normal air fares but includes travel by scheduled airline from Heathrow and Manchester * first-class hotel accommodation * arrival and departure transfers * admission to the trade fair * services of an experienced tour manager. The current programme comprises the following tours:

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Registration at the door costs £2, but free advance registration tickets will be sent if you return the application before 10.00 am on the last day, November 20.

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CW

Need for a national museum of computers

AM writing in the hope of encouraging better contacts and co-operation between schools and industry. At this school, through the generosity of several local firms, we have acquired a PDP-8 and ancillary equipment. We have no financial resources for computer equipment but we would be interested in surplus equipment which may have and would be willing to donate, either to maintain the school's computer activities or for a small museum of computer technology we are repairing.

Clearing doubts on post codes

OUR readers have been misled by Ron Lindsay's remarks in your article "Doubts over Post Office coding" (CW, May 25). His claim that postcodes as a business reference system are still some way to go before it is workable, is just not true.

The system is widely used by large numbers of firms and organisations. Nor is there anything in his assertion that future

equipment for our museum, it became apparent that many historically significant pieces of hardware were being discarded. It seems obvious that there is a serious need for a national museum of information sciences and computing. A single gallery in a major museum, as exists at present, is insufficient to be at all representative.

The computer is revolutionising society and historical material relevant to this is fast disappearing or in some cases has disappeared.

Given that many colleges of education are being closed

down, leaving excellent buildings available, one of these could surely be a potential site. The value of such a museum for educational purposes and future historical and sociological research would be considerable.

Even if the idea of a national museum is not original, I would be interested in the response of Computer Weekly readers to the idea.

M. J. COOKSON
Head of Computer Studies
Nicholas Breakpear
RC School
Colney Heath Lane
St Albans

changes to the system may be needed to cope with growth. From the start, it was specifically planned to cater for expansion and to last at least until 2001.

As numerous businesses have found to their advantage, the postcode file is the most comprehensive reference system in the UK with unique facilities for keeping it up to date and with an ability to identify even in-

dividual properties if needs be. It is not possible for me to extol the benefits of postcodes here but if your readers are interested, a free booklet entitled "Using Postcodes in Business Systems" is available from Postcode Consultancy, Postal Headquarters, London, EC1A 1HQ.

PETER H. YOUNG
Central Headquarters
Post Office
London

LETTERS

To: The Editor, Computer Weekly,
Dorset House, Stamford Street, London SE1 9LU

Chance to influence Cobol development

SOME good points are made by Don Mills in his letter on the proposed COBOL SCL specification (CW, June 8), but he is off-target in some of his examples.

I have heard a number of explanations of the requirement to support 18-digit arithmetic in Cobol, but the size of a particular machine's arithmetic registers is not one of them. My favourite explanation is that 18 digits were necessary to represent the number of cents in the US Gross National Product, in the early 1960s.

There is an in-line loop facility in the current Cobol Journal of Development and I know of no reason why it should not be adopted for the next version of the ANSI Cobol standard which, at present, is being developed by ANSI.

ANSI was due to begin consideration of Procedure Division elements only in March this year, and it is unlikely to have completed this task in the two meetings since then.

In the longer term, anyone wanting to influence the development of Cobol or the Common Operating System Control Language, can write to Codasyl at PO Box 1808, Washington DC, 20013, USA.

PHILIP R. BROWN

Larbert
Stirlingshire

Britain—2000 AD

CONGRATULATIONS to David Butler on his winning essay (CW, June 15). Lateral thinking leads on to placing all the Green Circle Plan people in underground houses — before 2000 AD.

A group I was once associated with, winning the whole UK population could go into individual "detached" underground houses on a quarter-mile grid.

Leaving Britain with no planning blight and even more green and pleasant land for year 2000 with income.

BOB INGHAM
Warrington

Being fair to the PO

I WAS interested to read Focus on the treatment of the Post Office at a recent DPMA conference (CW, June 15).

The problem of the representation of monopoly organisations at independent conferences is an exercise in trading the narrow line between providing a sales platform and promoting a kangaroo court. This problem is exacerbated in the case of the Post Office, since every DP manager has his own horror story about telecommunications services in this country.

Just because the Post Office is a monopoly, however, and because its services are essential to business life, it is extremely important to have a balanced view of their present facilities and future strategy.

In our conference next September, "Post Office Telecommunications — the way ahead?" we have tried to achieve this balance by involving the PO in the development of the event. Its presentation will be subjected to critical examination from major users and consultants and, during informal sessions, from any participants with something to say.

While this may not be the perfect forum, at least the prisoner is allowed to speak on his own behalf before sentence is passed — whether you consider the prisoner to be the Post Office or the user.

NEIL A. JAMES
Information Studies Ltd
Chorleywood

Politicians wake up

From front page
The chairman of the working party, Eric Hammond, said it was necessary to reverse the current dependence in the UK on imported integrated circuits, and added: "The rich nations of the future will be those with their own microelectronics industries."

The report pointed out that there could be major financial returns for the UK from micro-based equipment sold on world markets but it was essential that the industry should have direct access to the latest technologies

The value of standards

YOUR report of the international conference in Paris on standards for computer users (CW, June 15) milked up two separate points I was making.

First, there are currently about 380 authoritative standards relevant to the use of computers. About 25% of these are upgraded or amended each year, and there are about 80 new projects in hand. The only source of information about these is a feature in the Computer User's Year Book.

Secondly, I contrasted the achievement in establishing standards by the CCITT, which now has about 65 dot trans mission standards, some of great sophistication, with the ISO performance in data transmission. The ISO group has produced over 1,600 documents but only 11 standards.

The CCITT workers know the value of standards, but computer people are not so motivated. However, at a recent ISO meeting, the UK challenged the others with these facts, with remarkable results. So we may now expect an improvement.

HUGH MCGREGOR ROSS
Chairman
Data Processing Standards
Committee
British Standards Institution

Too easy for some

I WAS puzzled by Puzzler's answer (CW, May 15). You really didn't have to go to all that trouble — any self-respecting soccer mauler knows that if you lose one match and have only one goal scored against you in three matches, you must have been beaten nine-nil.

Please make future puzzles even easier, since I don't have the time to work them out!

STEPHEN WATT
DP Manager

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It would be ideal if we could devise a method of verbal communication between machine and man, and apply this same system to inter-machine communication. This problem is the target of a one-year project which is being carried out jointly between Frank George, Professor of Cybernetics at Brunel University, and Tom Addis, a research worker at ICL's Research and Advanced Development Centre at Stevenage. It is hoped that both ICL and the Department of Industry may become involved in the project at a later stage.

Machine shall talk unto machine

By Professor Frank George

THE search for suitable interactive languages for man-machine interaction has been going on for a long time and has taken many different forms. I am mainly concerned in this article with the latest attempt, which is now going on, to find an automatic speech recognition system. But behind this effort lies a whole world of diversity.

It has been realised for several years now that to have a satisfactory human-like system (artificial intelligence) required that it has access to a natural language.

This implies, for simulation purposes, the need not merely to use, but to learn to use, such a language. For synthetic purposes — this is where the spin-off and the focus of this article is — the problem is enough to be able to converse in a natural language.

With this in mind, we immediately find a crop of such written languages that have grown up in the last 20 years, and one can think of some like Namer, Baseball, Sir, Oracle, Lip plus a whole lot more besides. These "conceptual" languages provide the necessary backcloth to the search for an auditory form of recognition.

The languages themselves fall into four categories, those with and those without syntactic analysis, and those with and those without an inference making capability.

Most of the languages use list processing computer languages, but this is really incidental to their capabilities.

They have the ability to make a question, for example, and, after interpreting the question, supplying the answer by searching the associated database or by making inferences from the information in the database.

An example would be a question like, "How many sub-items X have you in store Y?" The analysis of such a statement tells us: 1. It is a question; 2. "How many" is the interrogative phrase; 3. "Sub-item X" is the key noun and 4. "Store Y" is the important auxiliary.

One automatically calls up

the routine for "how many," which immediately searches for "how many what?" The main follows "how many," and if there is a further part in the sentence such as "in store Y" then this immediately is entered into looking at X (now) and Y (looking) of a matrix, where the number is found and the answer "we have 403 sub-items X in store Y" is printed out.

There is the very minimum amount of analysis involved, but it can in some circumstances be much more complicated. It sometimes needs to be more complicated to avoid the vagaries of actual linguistic usage.

Even when we define terms and can answer questions like "what do you mean by Z?" the difficulty remains that so many terms are defined by the context in which they are used.

Now if we change the modality of the recognition of the spoken word — granted a similar subsequent analysis — we have the new difficulty which we do not meet, of course, where the words and phrases are typed into the computer.

The recognition is now of phonemes and other units of speech that can be distinguished and which we distinguish in human conversation. We can already do this for a single word and the current search is for connected speech — the recognition of a complete sentence.

The difficulties encountered in machine translation problems over the written word occur here again, since it is both a problem of pattern recognition and a problem of understanding. The pattern recognition part of the problem depends upon the ability to recognise at least 40 phonemes in English of which 10 are vowels and 30 consonants. This is indeed a lower limit to what is required, since each phoneme can be analysed further into 10 distinctive features which recur in all the words of a sentence, and they recur in different patterns.

The consonants are further grouped into "voiced" and "voiceless," whether they are stops, fricatives, nasals, etc

(points of articulation) and bilabial, dental, etc (manner of articulation). So the recognition of a single word is a major problem in itself.

The further step is the recognition of words connected into sentences. This can be thought of as a Markovian problem in the sense that we know that each word in a sentence acts as a constraint on the other possible words.

But the recognition of this fact itself depends upon a measure of semantic clarity; so one might expect to invoke a field which has hardly been developed as yet — the semantic theory of information.

The fact certainly remains that if we can recognise a word we must be able to recognise a sentence; it is largely the



Most of the languages use list processing computer languages, but this is really incidental to their capabilities.

semantic complexity of the problem that is daunting, and made especially so by the need to link such automatic speech recognition to problem solving and logical considerations which ordinarily occur with the use of natural language.

There are a whole lot of different approaches currently being made, but for my own part I would like to see the main attack concentrate on four aspects:

1. The pattern recognition problem with respect to phonemes and their sentence distribution.

2. A Markovian analysis of these distributions.

3. A semantic information — theoretic analysis of the statement; and

4. A heuristic approach to the most likely match between apparent phoneme patterns and the likely semantic context.

The relation of heuristic methods to induction and of both to semantic information theory suggests that such a trial is, to say the least, "warm" and one we hope to pursue.

A start has been made in this family of problems, concentrating on automatic speech recognition (Addis, 1972) and a good deal of effort has already gone into developing further this promising start, but it is notorious that problems of language so often lead us into the domain of complete human intelligence, so we must not



Most of the languages use list processing computer languages, but this is really incidental to their capabilities.

As for the current research project which is just gathering momentum, the aim is to develop a method of automatic speech recognition for connected speech, where the structure of sentences is not, in practice, sufficient to act as "phrase markers."

The problem is one of pragmatics and involves within that context, both syntax and semantics. Even more vital is the need for the computer and the human being to share a world of common experiences; they must have something to talk about!

All this means that the human

has initially to limit his "conversation" from the fully pragmatic, involving gestures and showing behavioural signs of intention and the like, while the computer has to enlarge his domain by use of new inputs (visual, etc).

At least then there can be a world, like the Winograd world of coloured bricks for building, or perhaps something more complicated, which would allow conversation.

The emphasis has now, for one aspect of these new developments, moved on to a symbolic form of problem solving, and this entails concept formation

and hypothesis formation, and, above all, the use of heuristic methods.

But the other aspect of the present project lays the emphasis on meaning and the ability to understand what each says to each (man and computer) without now necessarily being involved in problem solving. Both aspects of the problem require an enormous amount of research effort.

1. Science Fact, edited by Professor Frank George, 340pp, £1.50. Topaz Books.

2. Machine Takeover, by Professor Frank George, Paperback 193pp, £2.50. Hardback 107pp, £7.25. Pergamon Press.

3. Human Behaviour in the Interactive Environment using a Single Spoken Word Recogniser, by T. R. Addis, Man-Machine Studies.

CAD/CAM '78, the sixth US computer-aided design and computer-aided manufacturing conference and exhibit, will be held at the Hyatt House, Los Angeles International Airport, on September 18-21. The seven sessions will focus on new applications of technology and management directions. The sponsor is the Computer and Automated Systems Association of the Society of Mechanical Engineers. Details from CAA/SME, 20001 Ford Road, PO Box 830, Dearborn, Michigan 48126, USA, tel: 313/721-1000, ext 402.

IN Amsterdam, Efficiency Bears this year will be the tenth International Exhibition of Office Equipment, held at the RAI Exhibition Centre on October 10-13. Details from RAI, Europaplein 5, Amsterdam, Holland, tel: 020-5411411.

ARTIFICIAL Intelligence is the theme of a conference co-sponsored by the AISB and G3, to be held in Hamburg on July 18-20. Details can be obtained from Onyx Skeman, Dept of Computer Studies, The University, Leeds 2, tel: Leeds 31701, ext 7284/7108.

A SEMINAR programme on the "State of the Art" is offered by Control Data Institute during July and August. Most of the seminars will take place in London, but also on the practical applications of microprocessors and microcomputers, and the structured design and programming workshop, will be held in Copenhagen and Amsterdam respectively, on August 3-4 and August 28-September 1. Details from Telex Bureau, COI, 77, White Street, London W1P 2NE, tel: 01-637 2171.

THE seventh conference on mechanised information storage and retrieval systems will be held at the Cranfield Institute of Technology, by Inspec, the Information Division of the Institution of Electrical Engineers (IIEE) will take place on July 17-20. It is a tribute to the intelligent information systems. Further details from Cyril

Clevedon or Tom Atkinson at Inspec, 122, Nightingale Road, Hinchin, Hertfordshire, tel: 0462 83331.

TWO conferences on non-invasive audio-vascular measurements and on computers in cardiology, will be held at Stanford University, Stanford, California, on September 11-12 and September 12-14 respectively. The sponsors, besides the Stanford University School of Medicine, Cardiology Division, include, for the first conference, NIA, and for the second, the IEEE Computer Society. Details from M. E. E. Computer Society, Conference Coordinator, Stanford University School of Medicine, 701 Welch Road, Suite 303, Palo Alto, CA 94304, tel: 415/497-7507.

CONVENTION Informatique 78, the international conference on data processing, will be held at the Palais des Congrès in Paris, on September 18-22. The conference is part of Sibos, the data processing, hardware, communications and office equipment exhibition. Details from French Trade Exhibitions, French Chamber of Commerce House, 54 Conduit Street, London W1, tel: 01-438 5044.

A VARIETY of courses on management systems development and systems analysis is offered by British Management Centre at Blyth House, Stoke Newington, London N16 3PP, tel: 01-516 3411. A brochure detailing courses until January 1979 is available from the above address.

A BROCHURE of courses for systems analysis (rent now until December) is available from John Hargrave and Co. For details contact Valerie Burr, Course Leader, at John Hargrave and Co Ltd, 81/83, Farringford Road, London EC1R 3BQ, tel: 01-242 1831.

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*N.B.A.C. Businessman Readership Survey 1978



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
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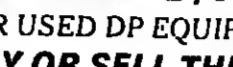
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ness and knowledge of the beneficial uses of computers; ● To publish a journal at least quarterly.

Staff have now been recruited to handle the administration and secretarial functions of the Institute under the control of a Secretary-General, and will operate from the new headquarters in Henleight Street, Covent Garden. It is, however, necessary to retain the existing DPMA premises at 27a York Road, Maldenhead, until such time as the bandwidth of records, etc. is complete, and all inquiries should be routed via this address for the time being.

We trust that IDPM will continue to co-operate with Computer Weekly in the very practical work by the DPMA in mounting joint workshops, seminars, etc. Two recent examples which proved highly successful were the Communication Audit workshop presented by Nigel Laurie, which proved so popular that a similar project will be mounted in October of this year, and recently the flourishing Central London branch held an enlightening forum where the operational staff were given the opportunity to voice their opinions of their management. This proved to be extremely lively and provocative, and deservedly played to a packed house.

In consolidating the strengths and resources of two of the foremost bodies within the computer industry, the DPMA has provided a professional Institution of Data Processing Management to serve all levels of those involved in using computers as an aid to their business.

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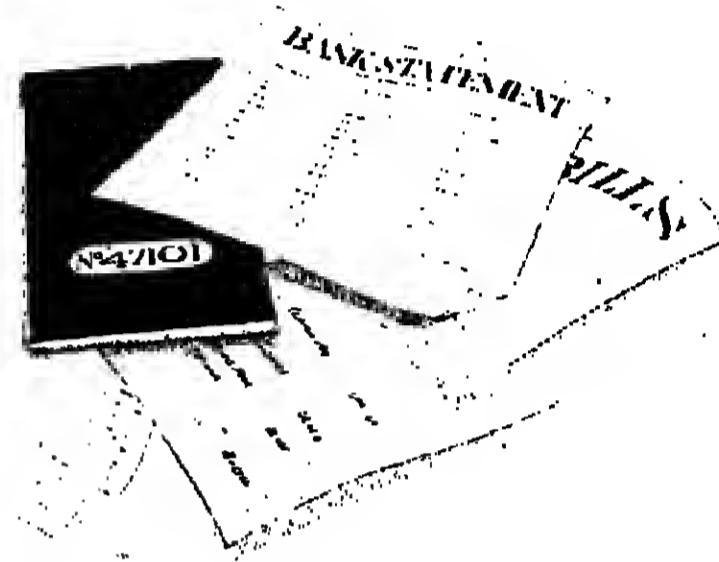
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AND FIELD ENGINEERS

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Applicants should be qualified to at least ONC or possibly HNC in electronics, or with relevant experience in field maintenance of computers and peripherals.

Highly competitive salaries will be offered in addition to usual fringe benefits, plus a company car or car allowance.

For further information write giving a brief résumé of your career to date to Barrie Millatt, Wang Electronics Ltd., Argyle House, Joel Street, Northwood Hills, Middlesex HA1 1NS, or phone him at Uxbridge 52195.

NEAT/3
PROGRAMMER

Applications are invited from mature and capable programmers with at least two years' experience to join our Data Processing Department. A knowledge of on-line application and of LEVEL 2 would be advantageous as the Society plans to develop a communications network with the acquisition of a Criterion 8450, scheduled for delivery in September. The Society offers an exciting career to applicants who are prepared to work on their own initiative and accept responsibility. The position provides an attractive salary structure, concessionary mortgage facilities and free membership of BUPA.

In the first instance applicants should write giving details of educational background, career history and current salary to:

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Computer Services Manager
(Staff Appointments)
Birmingham Building Society
42 Waterloo Street
Birmingham, B2 5QH

Senior Programmer

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Nationwide, 100+ Analysts and Programmers are producing a new generation of teleprocessing systems using our private switched network. This links three large IBM mainframes to each other and to a host of plug compatible terminals in our production locations throughout the UK.

Development teams are distributed, and each has instant access to all three production bureaux via its own terminals, with responsibility to install its systems across the country.

One team, developing on-line transaction processing accounting systems using Total/Environ, is in urgent need of a Senior Programmer having thorough IBM knowledge.

Experience of database/driving software would be advantageous.

We will pay you a salary according to ability and experience, and assist in relocation expenses. The location is in pleasant farming countryside, and private housing is plentiful and inexpensive by national standards.

Please write in the first instance, enclosing details, to the address below. (Reference 788 must be quoted on your envelope. Enclose separately a note of any companies to which your application should not be sent.)

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WARRINGTON, CHESHIRE,
TELEPHONE WARRINGTON 51291
EXTENSION 337



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PDP 11/70: DEC 10

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ICL 2904

(2900 or 1900 EXPERIENCE)

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You'll need at least 1 year's experience on OS 2000/ GCOS. It's a two shift system, and perks include 4 weeks' holiday, a season ticket loan and programming prospects.

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Computing is based upon an IBM 370/138, 512K machine running under DOS/VS with over 100 local and remote V.D.U. terminals under THIRST.

We offer attractive salaries together with excellent conditions of employment.

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Amersham and City based

Programmers are required at all levels to work on mini computer projects. Applications are mainly accounting systems and primarily on Hewlett Packard, Data General or DEC equipment. Development is either carried out at the client installation or in-house at Amersham. One particular requirement is for COBOL or FORTRAN experience preferably on Hewlett Packard or Data General equipment, but experience on other commercial mini systems will be considered. The essential requirements in all cases are two years' experience in a real-time multiprogramming environment on commercial mini based systems and the ability to contribute significantly to the division's growing technical expertise.

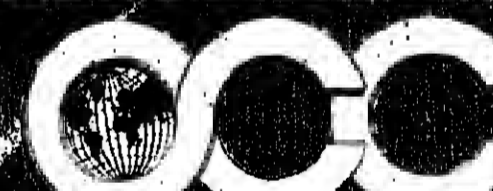
Mainframe Division

London & Home Counties

Analysts and Programmers are needed to work on the full range of commercial applications from small batch projects through to large on-line database systems. The majority of consultancy work is carried out by small teams based at customer installations throughout London and the Home Counties. Candidates must therefore be prepared to work in and around London for which travel expenses will be paid. Systems personnel should have a broad systems and programming background within the commercial area and must have the personality suited to working within a customer environment together with the potential to work in a team leadership capacity. For programming applicants, PL/I is of particular interest but COBOL, Assembler or Mark IV on any mainframe will be considered (re-training on IBM given). Any specialist knowledge such as CICS or IMS would be of particular value.

To apply for these positions or for further information please call Sharon Matthews on 01-242 8356 (office hours) or Bitterley (02774) 22351 (evenings/weekends) or write to the above address quoting reference 450/CW/5M.

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Guildhall, E.C.2

PROGRAMMER

£4183-£4954

(Salary review July 1978)

The Corporation of London is seeking a Programmer to a team of five other programmers in its installation which is responsible for a wide range of financial and non-financial systems. For example, Integrated Accounting System, R and Rent Collecting System, Stores, School Fees, Payroll, etc., together with Traffic Tickets, Register of Electors Examination System, etc.

The successful candidate should have 18 months of COBOL or PLAN programming experience and will be given in-house training and further external training as necessary. The general environment is such that a broad base of experience can be obtained from the installation. Both COBOL and PLAN languages are used.

The salaries are inclusive of a salary supplement of £3,000 special supplement £477 and the 6% Phase II adjustment, and will be commensurate with experience. Annual increments are then granted up to the scale line. Other benefits include generous holidays, superannuation scheme, season ticket advances, subsidised staff canteen and resettlement advances in approved cases.

The installation comprises an ICL 1902S 48K side processor, 3E0S, 4 tape decks, etc. and GEORGE 2 operating system is in use.

Applications with details of working experience, Academic papers, or enquiries, are invited and should be addressed to:

Computer Services Manager
Guildhall, London, EC2P 2EJ

TEHRAN

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Consider the following:

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A generous tax free cash income of between \$27,920 p.a. and \$33,680 p.a. for personnel with 4-8 years' applications experience. Higher salaries are available for more senior and specialised positions.

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The company provides a separate apartment for EACH employee, the size of which varies according to the family.

The company pays for all utilities, e.g. gas, electricity, etc. with the exception of the telephone.

The company provides a good standard of furnishings for the apartment including television, washing machine, fridge/freezer, etc.

N.B. The company budgets for an average of \$17,000 to cover first year rental and furnishings for EACH apartment.

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The company provides home to office transportation.
The company pays local school fees for children over-5.
The company pays Medical Insurance.
The company pays emergency home leave where necessary.

HOME LEAVE

The contract is for 18 months' duration and a family trip home is paid for after 12 months.

JOB CONTENT

The company has been awarded a substantial contract due to its reputation for systems and software development based on Honeywell computers. The scope of this project ensures a high level of job satisfaction.

FUTURE CAREER PROSPECTS

The company is a well established systems software house and NOT just a bodyshop. Consequently, they view each new appointment as the start of a long term career through an initial assignment in Tehran. In addition to IRAN, future opportunities exist in the USA, UK and EUROPE.

REQUIREMENTS

PROGRAMMER/ANALYSTS

Minimum of 4 years' good experience in COBOL with applications knowledge of GCOS and JCL.

SYSTEMS PROGRAMMERS

Around 8 years' experience in DP with extensive knowledge of GCOS, GMAP, TDS and/or NPS.

DATABASE SPECIALIST

Around 8 years' experience in DP with extensive knowledge of GCOS, IDS, TDS and database design.

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THE BEST OFFER AVAILABLE

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LONDON

My client currently operates a large twin IBM based bureau, specialising in systems for the advertising industry. They are soon to take delivery of an additional machine, a PDP 11/70 to cater for their expansion programme (future plans include ordering 2 more PDP 11/70's during the next 18 months). Enjoying the financial support of their parent public company, this thriving young subsidiary employs approximately 60 DP staff. It has good internal communications, with highly visible senior management and practices a "promotion totally on merit" policy. All the current systems are to be redesigned and rewritten to operate in an on-line environment offering a totally integrated package to cope with the needs of the advertising industry. Over 40 advertising agencies are serviced by these administrative and accounting systems.

DEC PROGRAMMERS

£4000 - £6000 Basic +

JUNIOR & SENIOR

The installation of a large disc based PDP 11/70 and the probability of 2 additional 11/70s in the next 18 months give rise to a heavy development schedule. Very interesting projects are to be undertaken including sophisticated on-line systems for the booking of TV time. The machine will operate under RSTS and use RMS II/K file management system.

JUNIOR Programmers will have the opportunity to develop their skills at a fast pace within a technically advanced environment.

SENIOR Programmers will enjoy significant responsibility in the development of sophisticated systems.

All Programmers will gain highly marketable experience within a very attractive company. Both positions require some exposure to DEC programming.

RW 28/2

RSTS SPECIALIST MANAGER

£NEG

This person will be responsible for the generation and maintenance of machine software and the development of PDP applications programs by his team. He will be highly experienced in DEC systems and possess a thorough detail level knowledge of RSTS. This is a superb opportunity for a strong technician to develop his career into management through an interesting and challenging role.

RW 28/3

PROGRAMMER/ANALYSTS

IBM DOS COBOL

To £6000 pa

In addition two Programmer Analysts are required to design and implement significant enhancements to current systems. This interesting project requires self-reliant, young professionals who can enjoy a company atmosphere which encourages them to use their initiative and imagination to the full. The steady pressure of an assured workload will enable you to develop your skills at your own pace. Planned growth will allow the company to accommodate fast developers.

RW 26/4

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Over 60 staff working exclusively on the implementation of online systems on the ICL range

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1900 2900 VME/B VME/K

Telecomputing continues to develop TPS as the outstanding tp monitor for the ICL range. We are now planning our new software for VME/B, VME/K, and for intelligent terminals. We got it right with TPS - now is the time to join the small team who will develop and support another winner.

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Must have extensive experience in the design and development of online transaction processing systems. Telecomputing specialises in implementing advanced systems using communications terminals. We operate internationally with every client bringing his own unique system requirements and we need the senior staff to design and develop those systems.

Applications Design and Programming

Our client services teams continue to expand to meet the growing demand for our software product and project services. We need more experienced programmers and systems analysts/designers. Junior vacancies require at least one year ICL Cobol experience; in more senior positions your specific computer background is less important. All our work is for online systems but you can learn that after you join us. Our teams have already implemented applications such as order entry systems, production engineering, stock controls and mail order. More are in the pipeline. There are opportunities at all levels. Continuous training will develop your skills and promote your career growth.

Lecturer (Commercial D.P.)

To join a small team providing formal training to our clients. We require an established lecturer in computer disciplines or experienced computer programmer with lecturing skills and strong training motivation. You will not spend all your time lecturing. You will have the opportunity to keep abreast of the latest developments by spending part of your time working with the applications, design and programming staff.

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To sell TPS - the leading software product for ICL communications systems. We are currently taking one order every three working days and need additional Sales Staff to respond to the tremendous demand for TPS and other Telecomputing quality software products. Computer experience and sales motivation are essential; experience of terminal systems and of software marketing are useful but not mandatory. Ideally we would like to meet system designers and programmers who have either moved or wish to move into sales.

Technical Writer

Responsible for writing, publishing and updating our systems and software publications for TPS online systems; i.e. manuals and bulletins covering systems design, programming, system creation and operation. We require an experienced computer technical writer or an experienced analyst/programmer with the writing skills and motivation to produce quality publications for our clients.

Telecomputing started in Oxford in 1974 and has more than doubled in size each year. We are now providing advisory, training and implementation services for installing online computer systems around the world. We have our own 2904 and a 2950 on order. Our activities are continuing to expand and we shall soon announce a microcomputer display terminal. This year we shall double in size again. What you join Telecomputing you are taking the opportunity to develop your own career in a growth company. We have an informal atmosphere and expect to pay attractive salaries and bonus.

Please write or phone:
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Seacourt Tower
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Software Design & Development

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But do it in 1978.

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TWO ESSENTIAL QUALIFICATIONS

We are seeking candidates with a good first degree or postgraduate qualification in Computer Science or Electrical Engineering/Mathematics/Physics with Computer Science as an ingredient. Your experience may have been gained in any environment involving the specification, design and testing of software for real-time systems, and whilst experience related to advanced

In the USA

telecommunications technology would be an advantage, it is not essential. There are also positions available for candidates with an interest in Advanced Systems Research and Planning.

THE REWARDS

As a successful candidate you will move ahead in terms of income, life-style, career progression and experience. Above all, you will enjoy the satisfaction of working in a company which recognises the vital importance of systems innovation to future business success: an attitude which is amply reflected in the back-up and rewards the company can offer.

RANGE OF OPPORTUNITIES

Our clients' offices are situated on the outskirts of a major city with easy access to countryside and lakes. Relocation costs and immigration formalities will be looked after by the company.

We would like to discuss with you the range of opportunities available — opportunities which will enhance your experience, develop your career prospects and increase your earning power.

As an initial step, send brief career details or write or telephone for full details and an application form to: Euroselection, 6-8 Emerald Street, London WC1N 3QA or for an informal discussion telephone Barry Eagles on 0171 3601699. Your enquiry will be treated in the strictest confidence.

euroselection
Management Consultants

Live and Learn

No profession is changing as fast as computing. That means exciting career opportunities. But it can also mean problems — for those whose careers fail to develop as fast as the technology.

Data Logic operates at the forefront of computing, applying the very latest hardware and techniques to practical commercial problems. We cover the range from mainframes to the smallest computers. We are leaders in the use of microprocessors for applications that not so long ago required far larger machines. Several of our projects involve dispersed networks of ten or more minicomputers.

The exceptional scope of work is important to our staff. We can match their individual experience to their

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Over the past year Data Logic has grown from 120 professionals to today's total of 280. Our expansion has meant unrivalled opportunities for career progression. We are not prepared to promote people before they are ready for it. But when they are ready — and we give all the assistance we can — they know that the positions as senior programmer, senior analyst, project manager and consultant will be there waiting for them.

In short, people at Data Logic have some of the most satisfying work you can find. And the extra satisfaction of learning as they do it.

Project Managers

For mainframe, minicomputer and mixed processor systems, usually supporting terminal networks. Increasingly, Data Logic's turnkey projects involve multiple, dispersed minicomputers.

Applicants must have at least 5 years implementation experience. They must have managed a sizeable project or have taken substantial team responsibility.

Senior 2900 System Designer

For consultancy and implementation projects, with a bias towards large ICL 2900 models. Applications will include database systems and communications networks. Extensive knowledge is required of hardware capability, operating systems and standard software. The scope for application of this knowledge and for career progression will be considerable.

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For work at the forefront of the commercial application of small computers. The majority of projects will involve data communications and several systems now in their early stages include many interconnected processors. Applicants should have at least 3 years design experience, preferably including system sizing and performance assessment.

Scientific/Mathematical Programmers

Principally for real time minicomputer systems applied to analysis and/or control in scientific environments. There may also be some problem solving in high level languages on mainframes. Applicants should have a relevant degree in the mathematical sciences and one or more years practical experience in assembler or FORTRAN.

COBOL and PL/I Analysts

For mainframe projects involving a variety of interesting and demanding applications, including banking, insurance, manufacturing and distribution. Applicants should have 3-5 years analysis and programming experience. A sound knowledge of COBOL will be an added advantage.

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For design and development of systems incorporating custom-built devices such as interfaces and terminals, with an emphasis on the use of microprocessors. Applicants should have a degree in electronics or computer science and have programmed mini or micro computers at assembler or microcode level.

Programmers - Small Commercial Systems

For implementation of transaction systems on a variety of minicomputers. Ideally, candidates should have experience of RPG1, BASIC, COBOL or FORTRAN applied in a commercial environment.

Database Consultants

To advise clients on the creation or upgrade of databases and to assist Data Logic teams in the design of retrieval systems. Projects will involve both mainframe and stand-alone minicomputer configurations.

Applicants should have experience in the design of record structures and have used at least one of the leading database packages such as ADABAS, IMS, TOTAL and DMS12. Knowledge of banking or insurance is of particular interest.

Data Logic

Most vacancies exist in our offices in Greenford, Central London, Birmingham and Manchester. Telephone or write, indicating the positions of interest:

For Greenford and Central London, to:
W. D. Barrow
Data Logic Limited
FREEPOST, Westway House
320 Rutlip Road East
Greenford
Middlesex UB8 3BA
Tel: 01-578 9111

For the Midlands, to:
A. W. Taylor
Data Logic Limited
FREEPOST
Birmingham B2 4BA
Tel: 021-632 0533

For the North, to:
J. Anderson
Data Logic Limited
Warwick House
Stratford Road
Stratford-on-Avon
Tel: 081-672 3232

مكتبة ابن رشد

Netherlands

SPL's subsidiary in the Netherlands continues to grow fast and now needs more Computer Professionals.

We need

* A minimum of 2 years programming experience and either
* a good working knowledge of any major international mini-computer such as DEC PDP11 or Data General Nova.

or
* Practical experience of systems software work on any small computing equipment particularly in the areas of I/O handling, disc monitors, assemblers or high level language compilers.

or
* Experience of industrial systems applications based on mini or micro computers.

The total salary package will be very attractive to people at present working in the U.K. and will be in the range of £10,000 to £12,000 upwards. Applications from Dutch Nationals and others working outside the U.K. will be welcome.

If your experience does not fit these requirements but you are interested in opportunities or working overseas with a major British software house please contact us anyway.

Please write or phone:
Alan Taylor, Resources Manager
SPL International
12-14 Windmill Street, London W1P 1HF
01-636 7833 or phone direct Utrecht 315534

COMPUTER SERVICES..

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Manager National Computer Services

Manchester Based
c. £9,500

CWS Computer Services satisfies the total data processing needs of the £1,400 million turnover Co-operative Wholesale Society Limited and in addition provides computer services to Co-operative Retail Societies and other commercial organisations through its six regional Computer Service Centres.

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An extensive knowledge of both the technical and commercial aspects of the computer services industry with a bias towards sales and marketing are essential pre-requisites for applicants. Over and above this however, the man or woman appointed will be required to demonstrate a successful record of management achievement against a background of rapid growth and technological change.

The Group operates ICL mainframes throughout its network comprising both 1900 and 2904 systems. A triple 2960 configuration is scheduled for delivery during 1979 at the Group Head Office in Manchester. An attractive salary in the region of the figure quoted will be offered plus the usual fringe benefits expected of a leading National Organisation. Contact: P. J. Cropper, General Manager, CWS Computer Services, New Century House, Manchester, M60 4ES. Tel: 061-834 1212 ext. 6820. (office hours) 062-583 789 (evenings).

COMPUTER SERVICES..

CWS Computer Group



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Tel: 0473 78616

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Tel: 041-429 2100

CWS Computer Services
Stratford House,
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Tel: 0482 28212/3

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

SYSTEMS ANALYST

LONDON To £7500

A systems analyst with sound experience in commercial systems design and a desire to progress towards project leadership is required to augment an active date processing team. Candidates will be used to functioning in a project team environment and working to good standards. They should feel confident enough to take control of a small team and a total system, a programming background is not essential but would be an advantage. The ability to establish good working relationships with users and to communicate simply and clearly are more important factors of the job description. The successful applicant will work on unusual and interesting applications utilising some of the most advanced techniques. A full training programme operates and is available to all employees. In addition to a competitive salary the company are able to offer a comprehensive package of benefits.

Ref. E1/2906

PROGRAMMING PROFESSIONALS

WEST LONDON IBM 370 £5000-£7000

As a leading concern in their field our clients' commitment to date processing has been well-established over a number of years. They are now seeking to extend their use of existing hardware by developing a number of new systems using sophisticated techniques. They play an active role in the company's future growth. Transaction Processing and Database Management are just two of the fields in which successful applicants will be involved. Ideally they will have some relevant experience in these areas already and be seeking to enhance their technical knowledge whilst making a move which can provide long-term opportunities. Applicants who can offer from two years' experience upwards, programming in an IBM 370 installation, using COBOL or PL/I will be rewarded with an excellent commencing salary and a valuable range of fringe benefits.

Ref. W2/2906

PROGRAMMERS

SLOUGH To £5250

Our Client, a busy engineering company, is currently developing several on-line real-time applications.

If you would like:

- * To receive training in advanced IBM software
- * Develop COBOL programs involving database and TP systems
- * Work on a variety of applications projects
- * Five weeks' holiday a year
- * Excellent starting salary and conditions of employment
- * To join an active sports and social club

—and you have a minimum of 12 months' COBOL programming experience, then this could be a good opportunity to accelerate your career.

Ref. W1/2906

PROGRESSIVE ANALYST/PROGRAMMERS

HERTS./MIDDX. BORDER £4750-£6250

Our client, part of a large manufacturing organisation, is seeking progressive D.P. professionals to match their own exciting expansion plans. With the impending installation of the company's upgraded mainframe, the extra capacity is scheduled to cater for new systems development. The opportunity therefore exists for career minded programmer/analysts to gain extensive analytical experience in a variety of commercial applications. The persons appointed will be involved in system investigation and will be expected to develop projects into a real-time environment. Realising the importance of securing suitable candidates to join a professional team, the company offers competitive salaries, progressive career structures, four weeks' holiday, sports and social facilities and many other attractive staff benefits.

Ref. N1/2906

24-hour answering service
Please telephone for a confidential
discussion or write to:
30 Fleet Street London EC4Y 1AA
01-353 0981.

SENIOR COMPUTER OPERATOR With Large Systems Experience

We are a Southampton based company which operates a worldwide through container shipping service on behalf of five major shipping lines.

Recently we have installed a 88700 computer with an on-line database system to supplement our existing Honeywell 2080.

We now require a Senior Operator to work with both of these installations.

If the challenge of such a position appeals, and you have obtained a couple of years large systems experience, preferably with throughput equipment, we should like to hear from you.

The post offers an attractive salary plus excellent fringe benefits. In addition relocation expenses will be given where necessary.

Please write or telephone for an application form to:

FACTS
Mrs. L. Lacey
Assistant Personnel Officer
ACT Services Ltd
Richmond House
Terminus Terrace
Southampton

Tel: Southampton (0703) 34433
ext 3305

University of Bradford

LECTURER IN COMPUTER SCIENCE

School of Studies in Computing offer MSc, PG Diploma and Hon. B. Tech courses in Computer Science and a new B. Tech. Computing and Data Processing course commencing October 1978. Lecturers are also involved in teaching computing to students throughout the University. Salary within range £2350 to £3250 p.a. Further particulars and application forms to be returned by 14 July, obtainable from the Registrar, Post Box C1/17CW, University of Bradford, Bradford BD7 1DP.

EXCELLENT OPPORTUNITIES in Central London for broad range of **COMPUTER PROGRAMMERS** and **SYSTEMS ANALYSTS**. **ANALYST/PROGRAMMER** 2 years exp. on IBM 370/360/3090, £4,000-£5,000. **SYSTEMS ANALYST** 2 years exp. on IBM 370/360/3090, £4,000-£5,000. **PROGRAMMER** 2 years exp. on IBM 370/360/3090, £3,500-£4,500. **TO APPLY:** CALL: MARYLYN BAKER, BUILDING SERVICES, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

JBA

Software Specialists

Illinois USA \$18,000 to \$28,000 plus relocation.

A large international telecommunications group, who are world leaders in their field, have opportunities for software specialists to work on the design and development of sophisticated communications systems.

Applicants must have at least two years programming experience in high-level languages, preferably PL/I, and have worked on the design, programming and testing of real-time applications. A background in the telecommunications industry would be a definite advantage.

This is a positive chance to work on new technology where the career prospects are excellent. Relocation costs to the USA will be covered by the company. Interviews with the client are being held in London in early July.

If you are at all interested in these vacancies please telephone now to arrange an informal interview.

Contact: Jim Baker
JAMES BAKER ASSOCIATES
International Personnel Consultants
18 Maddox Street, London W1
Tel: 01-481 4478

The Boosey and Hawkes Group

TRAINEE PROGRAMMER

Boosey and Hawkes the largest manufacturers of musical instruments in the U.K. are seeking a Trainee Programmer.

Applicants aged 18-26, should be educated to a good 'A' level standard and ideally possess at least one year's experience on a large 2803/4 or System 3.

This is an excellent opportunity for a person who is willing to work suitable normal hours and has a desire to make a career in Data Processing.

We offer a competitive salary dependent upon experience and ability. Benefits include pension scheme and subsidised canteen.

For further details write to, or telephone: Eve Wood, Personnel Department, Boosey & Hawkes Musical Instruments Ltd., Deansbrook Road, Edgware, Middx. Tel. 01-852 7711.

BOOSEY & HAWKES

DUSSELDORF GERMANY

IBM/OS taskmaster programmer for 6 months' contract in Dusseldorf, excellent negotiable salary.

Focus Computer Consultants
01-487 5781

CITY OF BIRMINGHAM POLYTECHNIC
The following vacancy exists in the Computer Centre which operates an ICL 1902S (32K), and is proposing to install a further computer equipment.

SENIOR PROGRAMMER

£3385, £3702 + supplements of £312 + 5% (max. £208.56)
A working knowledge of at least two languages and experience of Educational Computing would be an advantage. Candidates must be aged 21 or over, have a minimum of 5 years' experience, and be able to produce references. Details from: The Personnel Officer, City of Birmingham Polytechnic, F. Block, Perry Barr, Birmingham B42 2BU. Please quote ref. AS/P/198. Covering with disqualify.

Abraxas Recruitment Division

ABRAXAS

West End House,
11 Lisle Place,
London W1R 1AB
01-439 8891

SHIFT LEADER

BERKS.
A position which will entail a great deal of responsibility. Suitable applicants will have an excellent ICL background and training knowledge of ICL/OLG III Micro. Supervision of air operators on shift will be required. Large configuration and rapidly expanding.

TO £2,000

SENIOR OPERATOR

CITY
An ideal opportunity for an experienced operator to progress in a highly professional operations department. 18 months' experience on IBM 370 using OS/VS/1 will be rewarded by an excellent salary. Mortgage subsidy. Full life assurance, subsidised meals and car allowance.

CIRCA £4,700

OPERATOR

CITY
IBM 370 DOS/VS/VS. Three shift system. Suitable applicants will have a minimum of 18 months' experience and will be good communicators. They will enjoy the first-class benefits associated with working for a company that sets high standards including Mortgage subsidy, Life, BUPA and Sports facilities.

£4,250

SENIOR OPERATORS

B. HERTS./N. LONDON
Seven Senior positions have recently been created for operators with 2-3 years' experience of IBM DOS/POWER/VS. A three shift system is in operation. A good salary, dependent on age and experience, is enhanced by Free Life Assurance, Canteen, Car Park and Sports facilities.

£4,000

DATA CONTROL SUPERVISORS

KENT/LONDON
Applications are invited for two positions both requiring ICL 2900/1500 experience. Either GEORGE II or III preferred. A strong commercial background, possibly in a Bureau, and the ability to relate effectively with supervisory experience.

TO £5,000

SENIOR OPERATORS

E. LONDON
Two positions with a large financial organisation are currently open to applicants with two years' IBM OS/VS experience. Knowledge of JCL and utilities useful. Company benefits include free restaurant and paternalist Mortgage/Loan Rates.

£4,000+

OPERATORS

NORTHANTS
ICL 1900/2800. Three shift system. Three operators are currently required by our client, based near Northampton with easy access from M1. One year's experience on any ICL machine. Benefits include Non-contributory Pension Scheme, Canteen and Four Weeks' Holiday. No location expenses.

£4,250

JUNIOR OPERATORS

CITY/C. LONDON
Several vacancies exist for junior operators with no months' experience. Salaries vary according to age and qualifications. ICL 1900/2800 or IBM 360/370 required. Excellent training offered and early promotion with 'new'. Applicants must be aged 18+ and prepared to work shifts.

£3,000-£4,000

We welcome applications from enthusiastic TRAINEES with a good standard of education and willingness to learn. Feel free to drop in any time during office hours to discuss a career in computing.

CONTACT: JASMINE OAKES FOR THESE AND MANY MORE VACANCIES

Abraxas Computer Employment Ltd.

SURREY

PROGRAMMER	1 year's RPS 11	To £5,500
SYSTEMS ANALYST	1 year's analysis & database	To £5,500
SYSTEMS ANALYST	Or RPS 11 prog to learn analysis	c. £5,500
SOFTWARE PROGRAMMER	2 years' financial systems	c. £5,500
PROGRAMMER	18 months' IBM Assembler	To £5,000
PROGRAMMER	2 + years' Cobol	To £5,000
PROGRAMMER	Plan & Cobol	To £5,000
SYSTEMS ANALYST	Fortran/PL1	To £5,000
PROGRAMMER	3 years' financial systems	To £5,000
PROGRAMMER	18 months' Cobol Honeywell 60	To £5,000
SYSTEMS ANALYST	2 years' low level language	c. £5,000
PROGRAMMER	2 years' experience	c. £5,000
PROGRAMMER	RPS 11 will learn to Cobol	c. £5,000
PROGRAMMER	1 year's experience	c. £4,000
PROGRAMMER	18 months' experience	c. £4,000
PROGRAMMER	10 months' commercial identity PL/1	To £4,750
PROGRAMMER	7 years' experience	c. £4,000

For further details and an application form please phone or call in.

AMES PERSONNEL
TELEPHONE: 01-767 0611

OPERATIONS STAFF CONTRACT OR PERMANENT

Computer operators and data preparation operators required on IBM, UNIVAC, HONEYWELL AND ICL equipment.

Salary range per week:

U.K.	£90 - £120
EUROPE	£180 - £180
MIDDLE EAST	£450 - £500

Telephone now for more information.

KEY OPERATIONS ASSISTANCE LIMITED

LONDON:	MANCHESTER:
4 HALF MOON ST.	820 ROYAL EXCHANGE
LONDON, W1V	CROSBY ST.
(01) 483 6736/8	MANCHESTER, M2
	(061) 852 8343

COMPUTER WEEKLY, June 29, 1978

XOREN

Elton House (East Wing)
54/58 Uxbridge Road
Ealing, London, W5 2TL
Tel: 01-667 1725

REAL TIME MINI SOFTWARE SPECIALISTS

£5,000-£9,000

Xoren is a young, independent software house specialising in systems design and programming of real time minicomputer and microprocessor systems.

Established in 1974, the Company has experience of working on projects in the following areas:

BASIC SOFTWARE	Operating Systems, Compilers, Linkers, Device Drivers, Debug Packages, Editors
COMMUNICATIONS	Message Switching, Telephone Systems, Data Collection, Concentrators, Terminal Emulators
PROCESS CONTROL AND TELEMETRY	Pipeline Control, Alarm Monitoring, Outstation Simulation, Materials Testing

Communicate with Racal

VOICE RESPONSE SYSTEMS

Chief Engineer Hardware

Head of Systems Software

Systems Engineers

Sales Executives

RACAL

RACAL MILGO, a member of the world famous Racal Electronics Group, is a leader in data transmission techniques, and is now broadening its activities by creating a NEW DIVISION to market COMPUTER CONTROLLED VOICE RESPONSE SYSTEMS, for data entry and file enquiry applications.

The following positions are our initial requirement and the successful applicants will assist in forming the basis of this new and exciting activity.

Chief Engineer, Hardware

The person we seek will have a broad background which may include systems or design experience in mini-computing in communications, data entry, retrieval systems or intelligent terminals. Experience with PDP 11 would be an advantage.

He/she will interface with the California-based equipment supplier, and provide the necessary technical expertise on systems and product hardware to the Company and its network of foreign distributors, involving some foreign travel for short periods.

Together with the head of systems software, the selected candidate will direct and support a team of systems engineers, to provide a complete user system facility. Probably aged 30 years and upwards, with a good degree, a strong practical ability, a self-starting approach and the ability to communicate are essential qualities.

Head of Systems, Software

The position requires reasonably broad experience, which may include applications programming for batch and real time applications, data entry file enquiry systems, or mini-computing in communications. Experience with PDP 11 would be an advantage.

He/she will interface with the California-based equipment supplier, and provide the necessary expertise on the software aspects of systems and terminals.

The selected candidate will also have overall responsibility with the Chief Engineer for the hardware and the software and support of a team of systems engineers, and interfaces with a sub-contract software house. Providing some foreign travel for short periods.

Probably aged 30 years and upwards, with a good degree, a strong practical ability, a self-starting approach and the ability to communicate are essential qualities.

Sales Executives

To sell these systems, two experienced sales executives and proven ability are sought for the South and North of England.

Familiar with the D.P. environment, a background of consultancy, bureau, or hardware software development, together with the ability to grasp sales applications quickly.

An attractive base salary will be offered, supplemented by a commission, based on sensible sales targets. The Northern position is based in Manchester.

Systems Engineers

Systems Engineers are sought to take responsibility for the implementation of customers systems and to support the sales teams. These mini and micro-based systems will require a good working knowledge of both hardware and software. The position requires at least two years' study and peripheral experience, preferably with PDP 11, and a communications environment. Equipment training will be provided.

Probably aged 20-30, they will have a good practical ability, a multi-attitude and flexible approach to dealing with customers, software houses, and technical service staff.

The NEW DIVISION will be situated in Reading, Berkshire, and the attractive total remuneration package will reflect the significance of these key appointments.

Please write giving details of experience, qualifications and present salary to The Personnel Officer, RACAL MILGO LIMITED, Prospect House, Thorn Street, Reading, Berks.

University of Essex

DEC system-10

Systems Programmer

in the Department of Computer Science Computing Service

Applications for the post of Systems Programmer in Grade Computer Officer 1A (salary scale £3,680-£8,178) are invited. Applicants should have a sound background in the theory and practice of operating systems. The successful applicant will also be fluent in assembly language, interests in distributed processing systems, micro-processors and computer networks would be a distinct advantage.

The successful applicant will join an established Programming Group, which has responsibility for all aspects of software maintenance and development on the University's Service machine. This is a DECsystem-10/70 providing an extensive timesharing and Batch service.

Applications (six copies) including a curriculum vitae and the names and addresses of two referees, should reach the Registrar (AG/39/CW), University of Essex, Wivenhoe Park, Colchester CO4 3SQ, from whom further particulars may be obtained by July 20, 1978.

Burroughs Software Programmer

Woking: £5,225

Due to internal promotion we have an opportunity for a Software Programmer to take responsibility for, and to develop, a wide range of in-house software utilities.

Candidates with Burroughs experience should ideally have a sound knowledge of Cobol, a working knowledge of Assembler and have worked in a data communications environment.

Company benefits include flextime, free lunches and modern working conditions.

For an application form please contact:



Miss M. Baldock, Personnel Officer
B.A.T. (U.K. and Export) Ltd.
Esport House, Woking, Surrey
Telephone: Woking 78111

HONG KONG POLYTECHNIC

Department of Computing Science

Applications are invited for Principal Lecturer, Senior Lecturer and Lecturer levels for the Department of Computing Science at the Hong Kong Polytechnic. The Department offers courses leading to a Diploma in Computing Studies, a Higher Diploma in Computing Studies and a Higher Diploma in Systems Analysis. A successful candidate will be required to undertake projects and case study work leading to an Associateship in Computing Studies or a research project.

The Department's own courses are, at present, commercially oriented and emphasis is placed on practical work. Students are required to spend a minimum of 15 weeks in a local OP department as an integral part of their course, in addition to undertaking projects and case study work. From October 1979, the courses will be offered under a credit-unit system.

The Polytechnic shares computer facilities with the 2 local Universities. Substantial batch processing facilities are available at all 3 institutions and present developments will facilitate the sharing of resources. In addition, at present 100 interactive terminals are available on the Polytechnic campus alone, and it is planned that this figure will rise to approximately 300 by 1980/81.

Successful applicants will have experience in one or more of the following areas: Advanced COBOL, Advanced Systems Analysis, Systems Data Base Management Systems, Project Management and Control, Systems and Computer Organisation.

General Qualification for Appointment: Principal Lecturer (a) a degree or professional qualifications, and (b) an advanced specialist qualification or substantial experience in a specialised field; and (c) substantial teaching and industrial/commercial experience; and (d) proven administrative ability.

Senior Lecturer (a) a degree or professional qualifications, plus preferably an advanced specialist qualification, and (b) at least five years industrial/commercial experience, and (c) substantial teaching and/or proven administrative ability.

Lecturer (a) a degree or professional qualifications or at least a Higher Technician qualification in the appropriate field of study, and (b) at least three years teaching experience or a suitable combination of professional and teaching experience.

SALARY SCALES:
Principal Lecturer: HK\$91,740 to HK\$113,340 p.a. by 6 increments.
Senior Lecturer: HK\$74,480 to HK\$100,380 p.a. by 6 increments.
Lecturer: HK\$40,820 to HK\$70,860 p.a. by 11 increments.
Note: HK\$ 68 on 1st July 1978.
(Commercial salary will be comparable with qualifications and experience.)

CONDITIONS OF SERVICE:
Appointments will be on a full-time basis, including contractual terms relating to pensionable service. Appointments may be offered further conditions of service including long leave, leave pay, and other benefits of the Polytechnic. Medical and dental treatment, children's education allowance, and a gratuity payable on retirement. A 25% of basic salary received upon retirement.

Applications forms and further information are obtainable from the General Secretary, Hong Kong Polytechnic, Kowloon, Hong Kong. Closing date for applications: 1st July 1978. Successful candidates should be notified by 15 July 1978.

MANAGEMENT POTENTIAL

ANALYSTS & PROGRAMMERS to £5k

SURREY, SUSSEX, MIDOX., BERKS

Several of our Client Companies have advised us that they require Analysts and Programmers with management potential.

The equivalent range covers ICL 1900 and 2900 series, IBM 360/370, IBM System/3, Burroughs B5000 and PDP 11. Whilst the languages taught are COBOL, PLAN, ASSEMBLER, P.L. 1, FORTRAN.

Our specialised experience and close contact with leading client companies in the computer field enable us to give you expert personal career guidance about nearly every opportunity in the area of your choice.

Simply phone us and ask for the information - what could be better? Phone A.R. Executive (Weybridge) 0922 41821 (Weybridge).

UNIVERSITY OF BIRMINGHAM
Faculty of Education
DEPARTMENT OF CURRICULUM STUDIES

POST OF RESEARCH FELLOW IN COMPUTER EDUCATION

Applications are invited from suitably qualified persons to work on a project to collect and develop materials for a course in the use of the Computer in Education, to assist in the implementation of suitable principle packages, and to initiate research into the use of the Computer at Secondary School level and with students and staff in the community with interactive systems, would be desirable. The appointment is for two years, with a possibility of extension to three years, or as soon as possible thereafter.

Salary on scale £3,860 to £6,170 plus expenses.

Further particulars from Assistant Secretary (Education), University of Birmingham, P.O. Box 363, Birmingham B15 2TT. (Application deadline 11.00pm - 12.00pm on 1st July 1978).



WIRRAL

PROGRAMMER

£3861-£4214 (inclusive of supplements)

To join a team developing systems on a 1903T installation running under Gecode 2+. Opportunity for a team person with the right experience to be involved in financial applications concerned with financial and non-financial applications using on-line facilities and data advantage.

Applications from the Director of Finance, PO Box 2, Treasury Building, Glenageary, Dublin, Ireland. Applications should be sent to the Director of Finance, PO Box 2, Treasury Building, Glenageary, Dublin, Ireland. Applications should be sent to the Director of Finance, PO Box 2, Treasury Building, Glenageary, Dublin, Ireland. Applications should be sent to the Director of Finance, PO Box 2, Treasury Building, Glenageary, Dublin, Ireland.

LOOKING FOR SOMETHING DIFFERENT?

QUALITY ASSURANCE ANALYSTS SALARY £20,000 P.A. + BENEFITS OPERATIONS ANALYSTS SALARY £24,500 P.A. + BENEFITS

Our client, based in the WEST MIDLANDS, is the Computer Services Department serving a large Group of Companies. They have a current requirement for a number of "DATA PROCESSING PROFESSIONALS," who will be involved with varied and highly sophisticated commercial projects utilising latest generation hardware.

Vacancies exist for:

QUALITY ASSURANCE ANALYSTS

Ideally you should have:

- ★ a minimum of 4 years' programming experience with a fluency in COBOL/JCL
- ★ an analysis background, which should have included some involvement with the design and implementation of large systems
- ★ a knowledge of DATA BASE, file handling and STRUCTURED programming techniques

All candidates should have a sound educational background with a minimum of 2 'A' levels, but preferably with an HND or relevant computing qualification.

CAREER prospects within the organisation are EXCELLENT and above average TERMS and CONDITIONS apply.

RELOCATION ASSISTANCE IS AVAILABLE.

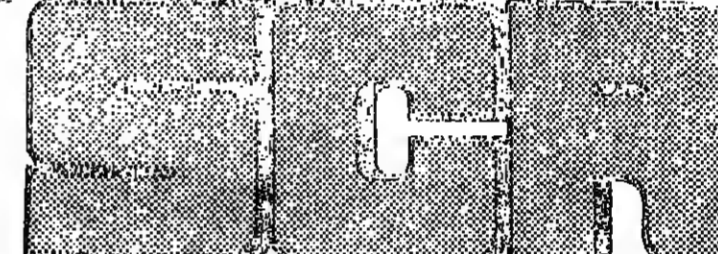
If these appointments interest you, then telephone me — Rod BEESON on 021-236 3781 or 021-745 5441 (EVENINGS & WEEKENDS)

OPERATIONS ANALYSTS

You will:

- ★ have a minimum of 3 years' computing experience, 18 months to 2 years of which should have been gained in an operating environment
- ★ be responsible for the design and development of operations projects and will provide for the medium and long term planning of the Operating DIVISION
- ★ be involved in developing standards and documentation, in addition to the specification of JCL for production and systems testing purposes

SPECIALIST
COMPUTER
RECRUITMENT
LIMITED



ROD BEESON 021-236 3781
Keppel, Equity and Law House,
35-37 Great Charles Street, Birmingham B1 2BR
MANCHESTER 061-835 0427
Keppel, Blackfriars House, The Pavilions, Manchester M3 8BB
LONDON 01-933 0471
Keppel 6, 102, Blarney Street,
London W1P 1JZ



SYSTEMS ANALYST

to £5780

Tunbridge Wells

A systems analyst with 1 year's analysis and at least 2 years' COBOL programming experience is required by our client in the heart of rural Kent.

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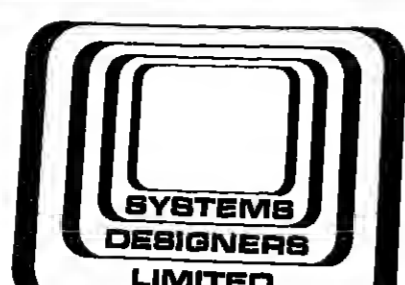
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Candidates may also like to be considered for a potential post in the Advisory Service with database work as a secondary activity. The Advisory Service represents a focal point within the Centre where users can raise queries regarding difficulties relating to the use of the Centre's main services.

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For further details and an application form contact the Secretary, University of Edinburgh, The Old College, South Bridge, Edinburgh 8 (quoting reference 7017) to whom completed forms should be returned by 28th July, 1978.

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The UNITED KINGDOM ATOMIC ENERGY AUTHORITY'S ESTABLISHMENT at WINFRITH, which is situated between EOWENMOUTH and WEYMOUTH in DORSET, has vacancies for:

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both in the development and application of micro and mini computer systems and in the development and maintenance of system software for mainframe computers. The Establishment is amongst the largest users of computers for research and development programmes. Currently it has a mainframe dual ICL System 4 computer on site and links to a substantial part of the work to other mainframe computers elsewhere in the U.K.A. There is a continuing programme of updating the Authority computer capability. Micro and mini computers are used throughout the site, demands for new applications of systems are constantly arising and a front end mini computer system which will link the site terminal network to the mainframes is under development. For mainframe system software maintenance and development experience of ICL 470 system software would be an advantage. Candidates are normally expected to have good honours degrees in appropriate subjects and suitable post-graduate experience, or to have corporate membership of relevant professional institutions. Appointments will be made to the HIGHER or SENIOR SCIENTIFIC OFFICER GRADES.

H50 Salary Range £4,388 - £5,828 pa

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Applications to: FREPOST, APPOINTMENTS OFFICER, AEE WINFRITH, DORCHESTER, DORSET, DT2 8DH.

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This is an exciting opportunity to join a small team at an early stage in its growth. Plantation Holdings operates a PDP 11/70 at Stairmore providing remote on-line processing to companies both within and outside the Group.

The successful applicant should have a minimum of five years computing experience with the emphasis on production, commercial and financial applications. Two of the first assignments will be for Group companies designing a production scheduling and work-in-progress reporting system. The position will involve travelling to locations mainly in the Home Counties.

This is a senior position with excellent prospects of early promotion. For further details and an application form please contact:-

Ames Personnel, Suite 14, Dryden Chambers, 119 Oxford Street, London, W1R 1PA.

AMES PERSONNEL 01-434 1106

National Coal Board

Mining Research and Development Establishment

The expanding programme of the Establishment covers research, development and testing in all fields of engineering and science. This year the Establishment is recruiting additional personnel to increase the effort in key areas of mine productivity and safety.

As a result of this expansion, there are vacancies for:

MINI-COMPUTER ENGINEERS AND SCIENTISTS

The National Coal Board has embarked upon a programme of applying computer-based monitoring and control systems to mining operations. This challenging and rewarding field of work is rapidly expanding to include coal face monitoring, coal transport systems, and monitoring the underground environment.

Applicants should be qualified in Electrical, Mechanical or Systems Engineering and have experience of monitoring and control systems. They should preferably be experienced in the use of mini-computers and microprocessors operating in real time.

The starting salaries will be in the range £5,000 to £6,500 according to qualifications and experience. Attractive benefits include nearly six weeks holiday.

Please apply to the Staff and Administration Manager, quoting reference no. 740.

National Coal Board,
Mining Research and Development Establishment,
Ashby Road, Stanbury, BURTON ON TRENT, Staffs. DE15 0QB.



THE UNIVERSITY OF LANCASTER

Temporary Lectureship in Computer Studies

Applications are invited for the post of temporary Lecturer in the Department of Computer Studies. Preference will be given to candidates with experience in data processing, machine-code programming or logic design. The appointment will be for a period of one year.

Further details may be obtained by sending reference L66/A1 from the Department of Computer Studies, The University of Lancaster, Bailrigg, Lancaster LA1 4YW, to whom applications should be sent not later than 1 July, 1978.

SALOP COUNTY COUNCIL

SENIOR SYSTEMS PROGRAMMER

Salary up to £8,097 per annum

(Phase 3 pay award pending 1st July, 1978)

This is a new post to head a small team which will be responsible for the evaluation, development, implementation and maintenance of all systems software. The Council operates an IBM 370/138 computer with a substantial remote terminal network which provides a service to both County Councils and District Councils. VM/370, DOS/VS and OL/1 are in use. A major new development programme is being undertaken, and there will be substantial enhancements to both hardware and software. The successful candidate will play a key role in their development.

Salop has plenty of cheap housing in predominantly rural surroundings, and generous assistance with removal expenses will be given in approved cases. Applicants will need to be technically competent, highly motivated and driven upon responsibility. Although any necessary training will be given, experience of some of the following would be an advantage: VM/370 and CMS, DOS/VS, RJE, OL/1 and CICS or other TP monitors. Applications and further details can be obtained from the County Treasurer, Shrewsbury, Salop, SY2 6ND (Telephone Shrewsbury 222233), returnable by 12th July, 1978.

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To design and implement systems, the Analyst will possess a programming background coupled with analysis experience on at least one major system. The person appointed will function as a team leader on certain projects.

ANALYST/PROGRAMMERS

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The Analyst/Programmer will hold responsibility for systems pertaining to one overseas subsidiary. Candidates should have a sound COBOL background with proven analysis experience along with the ability to liaise with line management.

PROGRAMMERS

£4500 - To £6000

Applicants should offer a minimum of 12 months' COBOL on any machine and display a mature approach, being particularly willing to accept additional responsibilities.

The company offers genuine career prospects, non-contributory pension scheme, season ticket loan, LVs and 4 weeks' holiday.

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Please write to Mr J. Berhar, British Engine, Longridge House, Manchester M60 4DT.

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OVERSEAS POSITIONS

Openings presently exist for OPERATOR TECHNICIANS to work in foreign locations on mini-computer based system data processing systems. Successful applicants should have H.N.C. or military equipment, with at least one year's experience working with mini-computers and peripherals.

Send resume to: JANET MITCHELL
Western Geophysical Company
268-290 Worton Road, Isleworth, Middlesex



Data Processing Recruitment Consultants

Mini Programmers & Designers Netherlands

Salary: to £16K

We are retained by a U.S. mini-computer manufacturer to recruit mini-computer Programmers and Systems Designers for its Dutch subsidiary. Candidates must offer three years programming experience specifically on one or more of the following machines:-

- DEC PDP 11
- DG Nova/Eclipse
- H.P. 3000
- Nixdorf 800/8700

Whilst in respect of the 'design' positions Commence experience in a feasibility, design and subsequent implementation capacity is essential. The

Company offers a rare opportunity for career based positions within close proximity to Amsterdam. The package includes periodic project bonuses, sickness, medical benefit and pension schemes, full relocation expenses for either single or married personnel, reimbursement of initial accommodation expenditure, travelling and site allowances. Additionally there will be an opportunity to relocate to one of the Company's EEC or Statelide operations. Initial interviews will be held in the U.K. after which short-listed candidates will be asked to spend one day in the Netherlands for final selection.

Real-Time Software E.E.C.

Salary: £10 - 16.5K + Outstanding Benefits

When it comes to State-of-the-Art Real-time Mini Software our client defers to no one. They are internationally regarded as 'technical frontier pushers' and as a valued project-team member you will share their prestige and acclaim.

To meet a continually phased growth programme our client is establishing several new project teams requiring Consultants, Project Leaders, Analysts and Programmers. The letter will be well versed in

Assembler and the former will either be graduates or have extensive relevant experience in lieu. Willingness to re-locate for a meaningfully extended period to one of the most desirable E.E.C. locations is important. Every assistance will be given to candidates and their families in re-location. Interviews will be held in London early in July and offers made within 7 days.

IMS Data-Base London + E.E.C.

Salary: to £9K (U.K.) to £16K (E.E.C.)

Our client one of the 'Seven Sisters' Oil Companies has asked Logistix to assist in recruiting a number of IMS Data base specialists up to project leader level and beyond. The only pre-requisite incorporated in our brief is that candidates are able to demonstrate solid IMS Data base skills. DL/I is of course essential and in combination with PL/I, COBOL or Assembler will be of considerable interest to our Client.

This company is amongst the most advanced and sophisticated users of D.P. and should be regarded for its long-term career potential rather than as a stepping stone to greener pastures. Fringe benefits normally associated with a Major Oil Company are offered together with other rewards of a more unusual nature. These are of course in addition to well above average salaries.

Mini Cobol — U.S. Bank City of London

Salary: £5.5K - 8.5K + Mortgage

One of the World's most prestigious U.S. Banks with European Headquarters in London and regional locations in numerous European capitals is expanding its sizeable Data Processing activities by introducing a range of sophisticated Mini computers to enhance their IBM 370/168 systems.

This new phase necessitates the recruitment of numerous senior personnel including Project Managers, Team Leaders, Senior Analysts and

seasoned Programmers under whose combined skill the bank propose embarking on this ambitious project. In particular MINI-COBOL as a programming language is essential and relevant experience possibly in finance or Banking will be especially welcome. These openings cannot truly be regarded as jobs they must be seen as career building opportunities.

Systems Designers + Programmers etc. Cheshire

Salaries: £6 - 9.5K (d.a.e.)

A very prestige client with headquarters in the Home Counties and regional offices located at Macclesfield, and throughout Europe, urgently require the following key personnel:

Real-time Programmers, Systems Designers & Compiler Specialists with 2/5 years experience. Of particular interest would be people with relevant experience in one or more of the following areas: Farrant or DEC with Basile RTLII or Coral and IBM or ICL with Assembler.

The scope of projects is both broad and demanding and certainly in keeping with the international prestige of this client - you will play an important role in project development and the opportunity to enhance your technical expertise is one of the attributes of working with this reputable group. Fringe benefits are well above average and full relocation expenses will of course be met. Interviews can be held in London or Macclesfield to your convenience.

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